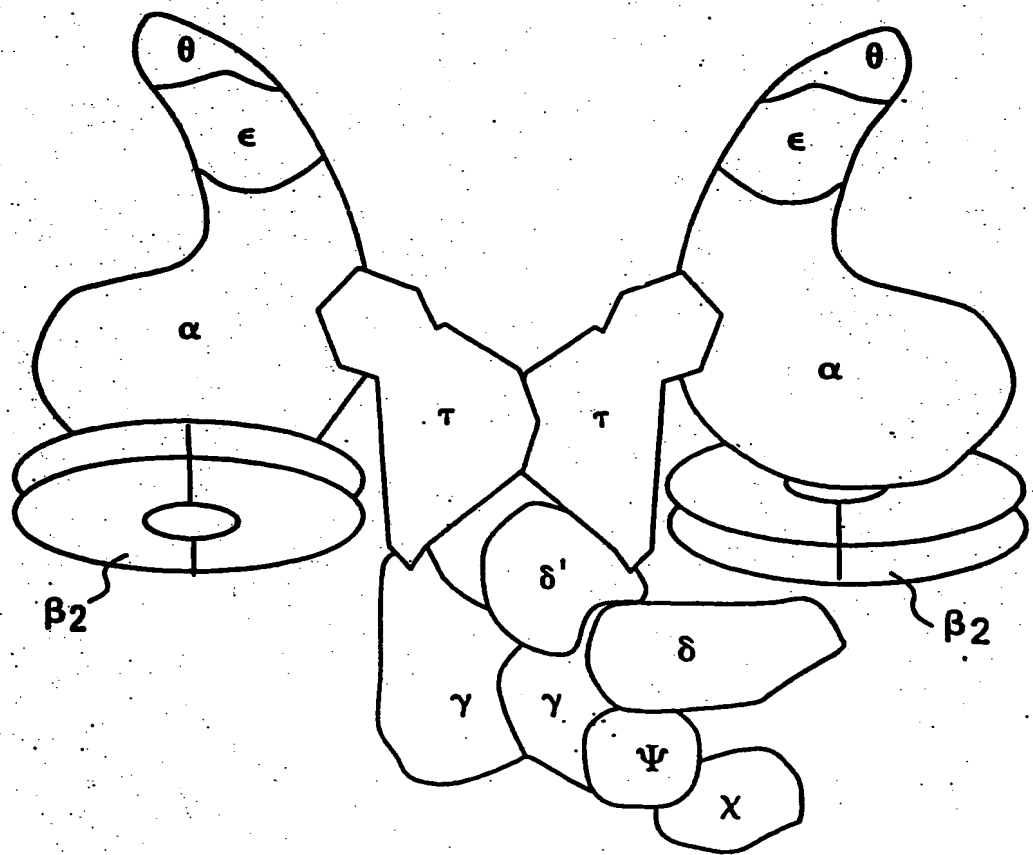


FIG.1



# ATP binding

E. coli  
 MSYQVLARKWRPQTFADVVGQEHVLTALANGLSLGRIHHAYLFSGTRGVGKTSIARLLAK  
 B. subtilis  
 MSYQALYRVFRPQRFEDVVGQEHITKTLQNALLOKKFSHAYLFSGPRGTGKTSAAKIFAK  
 \*\*\* \* \* \*\*\* \* \*\*\*\*\* . \* \* \* \*\*\*\*\* \*\* \*\*\*\*\* \*\*

E. coli  
 GLNCETGITATPCGVCDNCREIEQGRFVDLIEIDAASRTKVEDTRDLLDNVQYAPARGRF  
 B. subtilis  
 AVNCEHAPVDEPCNECAACKGITNGSISDVIEIDAASNNGVDEIRDVKVFPAPSAVTY  
 \*\*\* \*\* \* \* \* \* \* \*\*\*\*\* \* . . . \* \* \* \* .

E. coli  
 KVLIDEVHMLSRHSFNALLKTLLEPPPEHVKFLATDPQKLPVTILSRCLOFHLKALDV  
 B. subtilis  
 KVIIDEVHMLSIGAFNALLKTLLEPPPEHCIFILATTEPHKIPLTIISRCQRFDFKRITS  
 \*\*\* . \*\*\*\*\* \* . \*\*\*\*\* \* . \*\*\*\*\* \* . \*\*\*\*\* \* .

FIG. 2

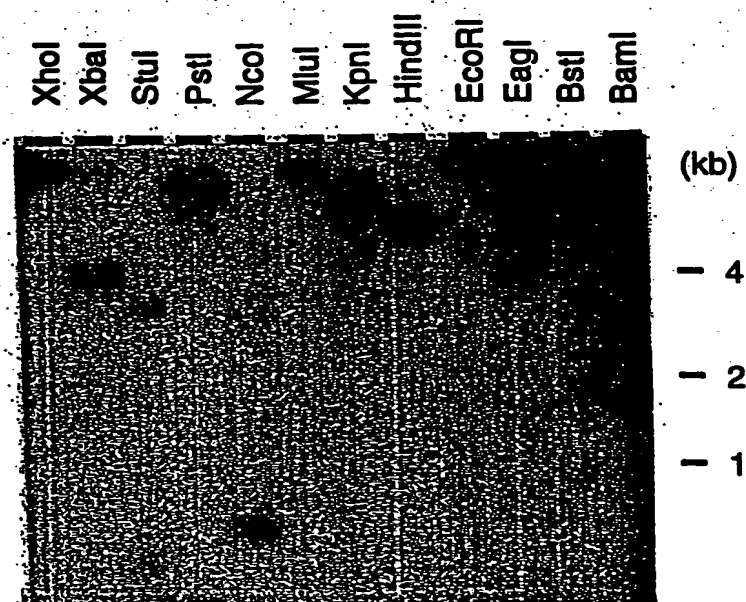


FIG.3

TCGGGGGGTG	GGGTTCCACAG	GTAGACCCCG	GCCCCCTCQCG	TGAGCCCCTT	TACCCAGGCC	60
GCCACCTCCT	CCAGGGGGGC	CAAGCGGTGC	AAGGAGAGGA	ACGTCCGCAC	<u>CACGCCCTAT</u>	120
					<b>S.D.</b>	
ACTAGCCTT	GTG AGC GCC CTC TAC CGC CGC TTC CGC CCC CTC ACC TTC CAG GAG GTG GTG					180
	met ser ala leu tyr arg arg phe arg pro leu thr phe gln glu val val					(17)
					CAC	
GGG CAG GAG CAC GTG AAG GAG CCC CTC CTC AAG GCC ATC CGG GAG GGG AGG CTC GCC CAG						240
gly gln glu his val lys glu pro leu leu lys ala ile arg glu arg leu ala gln						(37)
GCS TAC CTS TTC TCC GGS AC						
GCC TAC CTC TTC TCC GGG CCC AGG GGC GTG GGC AAG ACC ACC ACG GCG AGG CTC CTC GCC						300
ala tyr leu phe ser gly pro arg gly val gly lys thr thr ala arg leu leu ala						(57)
ATG GCG GTG GGG TGC CAG GGG GAA GAC CCC CCT TGC GGG GTC TGC CCC CAC TGC CAG GCG						360
met ala val gly cys gln gly glu asp pro pro cys gly val cys pro his cys gln ala						(77)
GtG CAG AGG GGC GCC CAC CCG GAC GTG GTG GAC ATT GAC GCC GCG AGC AAC AAC TCC GTG						420
val gln arg gly ala his pro asp val val asp ile asp ala ala ser asn ser val						(97)
GAG GAC GTG CGG GAG CTG AGG GAA AGG ATC CAC CTC GCC CTC TCT GCC CCC AGG AAG						480
glu asp val arg glu leu arg glu arg ile his leu ala pro leu ser ala pro arg lys						(117)
					C	
GTC TTC ATC CTG GAC GAG GCC CAC ATG CTC TCC AAA AGC GCC TTC AAC GCC CTC CTC AAG						540
val phe ile leu asp Glu ala his met leu ser lys ser ala phe asn ala leu leu lys						(137)

FIG.4A-1

TGS CTS CTC CTC GGS GGS CTC GTG	GTC TTC GCC ACC GAG CCC GAG AGG	600
ACC CTG GAG GAG CCC CCG CCC CAC	GTC TTC GTC ACC GAG CCC GAG arg	(157)
thr leu glu glu pro pro pro his	val phe ala thr glu pro glu	
ATG CCC ACC ATC CTC TCC CGC ACC CAG CAC	TTC CGC TTC CGC CTC ACG GAG GAG	660
met pro pro thr ile leu ser arg thr	gln his phe arg phe arg leu thr glu glu	(177)
GAG ATC GCC TTT AAG CTC CGG CGC ATC CTG GAG	GCC GTG GGG CGG GAG GCG GAG GAG	720
glu ile ala phe lys leu arg arg ile	leu glu ala val gly arg glu ala glu glu	(197)
GCC CTC CTC CTC GCC CGC CTG GCG GAC GCG	GCC CTT AGG GAC GCG GAA AGC CTC CTG	780
ala leu leu leu leu ala arg leu ala	asp gly ala leu arg asp ala glu ser leu	(217)
GAG CGC TTC CTC CTC GAA GGC CCC CTC ACC	CGG AAG GAG GTG GAG CGC GCC CTA GGC	840
glu arg phe leu leu leu glu gly pro	leu thr arg lys glu val glu arg ala leu	(237)
TCC CCC CCA GGG ACC GGG GTG GCC GAG	ATC GCC GCC TCC CTC GCG AGG GGG AAA	900
ser pro pro gly thr gly val ala glu	ile ala ala ser leu ala arg gly lys thr	(257)
GAG GCC CTC GGC CTC GCC CGG CGC CTC	TAC GCG GAA GGG TAC GCC CCG AGG AGC	960
glu ala leu gly leu ala arg arg leu	tyr gly glu gly tyr ala pro arg ser leu	(277)
TCG GGC CTT TTG GAG GTG TTC CGG GAA	GGC CTC TAC GCC GCC TTC GGC CTC GCG	1020
ser gly leu leu glu val phe arg glu	gly leu tyr ala ala phe gly leu ala gly	(297)
CCC CTT CCC GCC CCG CCC CAG GCC CTG	ATC GCC ATG ACC GCC CTG GAG GCC ATG	1080
pro leu pro ala pro pro pro gln	ala leu ile ala ala met thr ala leu asp	(317)
	glu ala met	

FIG. 4A-2

GAG CGC CTC GCC CGC CGC TCC GAC GCC TTA AGC CTG GAG GTG GCC CTC CTG GAG GCG GGA	1140
glu arg leu ala arg arg ser asp ala leu ser leu glu val ala leu glu ala gly	(337)
AGG GCC CTG GCC GAG GCC CTA CCC CAG CCC ACG GGC GCT CCT TCC CCA GAG GTC GGC	1200
arg ala leu ala ala glu ala leu pro gln pro thr gly ala pro ser pro glu val gly	(357)
CCC AAG CCG GAA AGC CCC CCG ACC CCG GAA CCC CCA AGG CCC GAG GAG CCC GAC CTG	1260
pro lys pro glu ser pro pro thr pro glu pro arg pro glu ala pro asp leu	(377)
CGG GAG CGG TGG CGG GCC TTC CTC GAG GCC CTC AGG CCC ACC CTA CGG GCC TTC GTG CGG	1320
arg glu arg arg ala phe leu glu ala leu arg pro thr leu arg ala phe val arg	(397)
GAG GCC CGC CGG GAG GTC CCG GAA GGC CAG CTC TGC CTC GCT TTC CCC GAG GAC AAG GCC	1380
glu ala arg pro glu val arg glu gly gln leu cys leu ala phe pro glu asp lys ala	(417)
TTC CAC TAC CGC AAG GCC TCG GAA CAG AAG GTG AGG CTC CTC CCC CTG GCC CAG GCC CAT	1440
phe his tyr arg lys ala ser glu gln lys val arg leu leu pro leu ala gln ala his	(437)
frameshift site	
TTC GGG GTG GAG GAG GTC GTC CTC GAG GGA GAA AAA AAA AGC CTG AGC CCA AGG	1500
phe gly val glu glu val val leu val leu glu gly glu lys lys ser leu ser pro arg	(457)

FIG.4B-1

CCC CGC CCG GCC CCA CCT CCT GAA GCG CCC GCA CCC CCG GGC CCT CCC GAG GAG GAG GTA	1560
pro arg pro ala pro pro pro glu ala pro ala pro pro gly pro pro glu glu val	(477)
GAG GCG GAG GAA GCG GCG GAG GAG GCC CCG GAG GAG GCC TTG AGG CCG GTG GTC CGC CTC	1620
glu ala glu glu ala ala glu ala pro glu glu ala leu arg arg val val arg leu	(497)
CTG GGG GGG CCG GTG CTC TGG GTG CCG CCG AGG ACC CCG GAG GCG CCG GAG GAG GAA	1680
leu gly gly arg val leu trp val arg arg pro arg thr arg glu ala pro glu glu	(517)
CCC CTG AGC CAA GAC GAG ATA GGG GGT ACT GGT ATA TAA	1740
pro leu ser gln asp glu ile gly thr gly ile *	(529)
CGACCTCGGA CAAGAGACCG TGGACAACAT CCTCAAGCGC CTCCGCCGTA TTGAGGGCCA	1820
GGTGCGGGGG CTCCAGAAGA TGGTGGCCGA GGGCCGCCCC TGCGACGAGG TCCTCACCCA	1880
GATGACCGCC ACCAAGAAGG CCATGGAGGC GGCGGCCACC CTGATCCTCC ACGAGTTCCCT	1940
GAACGTCTGC GCCGCCGAGG TCTCCGAGGG CAAGGTGAAC CCCAAGAAGC CCGAGGAGAT	2000
CGCCACCATG CTGAAGAACT TCATCTA	2027

FIG.4B-2

GGG	CAG	GAG	CAC	GTG	AGC	GCC	CTC	TAC	CGC	CGC	TTC	CGC	CCC	CTC	ACC	TTC	CAG	GAG	GTG	GTG	51
GCC	TAC	CTC	TTC	TCC	GGG	AAG	GAG	CCC	CTC	ATC	AAG	GCC	ATC	CGG	GAG	GGG	AGG	CTC	GCC	CAG	111
ATG	GCG	GTG	GGG	TGC	CAG	TGC	GGG	GAA	GAC	CCC	GGC	AAG	ACC	ACC	ACG	GCG	AGG	CTC	CTC	GCC	171
GtG	CAG	AGG	GGC	GCC	CAC	CCG	GAG	GAC	GTG	GAC	ATT	GAC	GGG	GTG	TGC	CCC	CAC	TGC	CAG	GCG	231
GAG	GAC	GTG	CGG	GAG	CTG	GAG	CTG	GAA	AGG	ATC	CAC	CTC	GCC	GCC	CTC	TCT	GCC	CCC	AGG	AAG	291
GTC	TTC	ATC	CTG	GAC	GAC	ATG	CTC	CAC	ATG	CTC	TCC	AAA	AGC	GCC	TTC	AAC	AGC	AAC	TCC	GTG	351
ACC	CTG	GAG	GAG	CCC	CCC	CCC	CCC	CAC	CTC	CTC	TTC	GTC	TTC	GCC	ACC	ACC	GAG	CCC	CTC	AAG	411
ATG	CCC	CCC	ACC	ATC	ATC	CTC	TCC	CGC	ACC	CTC	CAC	TTC	CGC	TTC	CGC	CGC	CTC	ACG	GAG	AGG	471
GAG	ATC	GCC	TTT	AAG	CTC	CTC	CGG	CGC	ATC	CTG	GAG	GCC	GTG	GGG	CGG	GAG	GCG	GAG	GAG	GAG	531
GCC	CTC	CTC	CTC	CTC	GCC	GCC	CGC	CTG	GCG	GAC	GGG	GCC	CTT	AGG	GAC	GCG	GAA	AGC	CTC	CTG	591
GAG	GCG	TTC	CTC	CTC	CTC	CTG	GAA	GGC	CCC	CTC	ACC	CGG	AAG	GAG	GTG	GAG	CGC	GCC	CTA	GGC	651
TCC	CCC	CCA	GGG	ACC	GGG	CTC	GGG	GCC	ATC	GCC	GCC	TCC	TCC	CTC	GCG	AGG	GGG	AAA	ACG	GCG	711
GAG	GCC	CTG	GGC	CTC	CTC	GCC	CGG	CGC	CTC	TAC	GGG	GAA	GGG	TAC	GCC	CCG	AGG	AGC	CTG	GTC	771
TCG	GGC	CTT	TTG	GAG	GTG	GAG	TTC	CGG	GAA	GCG	CTC	TAC	GCC	GCC	TTC	GGC	CTC	GCG	GGA	ACC	831
CCC	CTT	CCC	GCC	CGC	CGC	CGC	CAG	GCC	CTG	ATC	GCC	GCC	ATG	ACC	GCC	CTG	GAC	GAG	GCC	ATG	891
GAG	GCG	CTC	GCC	CGC	CGC	CGC	TCC	GAC	GCC	CTG	AGC	CTG	GAG	GTG	GCC	CTC	CTG	GAG	GCG	GGA	951
AGG	GCC	CTG	GCC	GCC	GAG	GCC	GCC	CTA	CCC	ACG	CCC	ACG	GGC	GCT	CCT	TCC	CCA	GAG	GTC	GCG	1011
CCC	AAG	CCG	GAA	AGC	AGC	CCC	ACC	ACC	CCG	GAA	CCC	CCA	AGG	CCC	GAG	GAG	GCG	CCC	GAC	CTG	1131
CGG	GAG	CGG	TGG	CGG	GCC	GCC	TTC	CTC	GAG	GCC	CTC	AGG	CCC	ACC	CTA	CGG	GCC	TTC	GTG	CGG	1191
GAG	GCC	CGC	CCG	GAG	GTG	GTC	CGG	GAA	GGC	GAA	CTC	AGG	CTC	CTC	CTC	CCC	GAG	GAC	AAG	GCC	1251
TTC	CAC	TAC	CGC	AAG	GCC	TGC	TCG	GAA	CAG	AAG	GTG	AGG	CTC	CTC	CCC	CTG	GCC	CAG	GCC	CAT	1311
TTC	GGG	GTG	GAG	GAG	GTG	CTC	GTG	CTC	CTG	GAG	GGA	GAA	AAA	AAA	AGC	CTG	AGC	CCA	AGG	AGG	1371
CCC	GCG	CCG	GCC	CCA	CCT	GAA	GCG	CCC	GCA	CCC	CGC	CGC	CCT	CCC	CCC	GAG	GAG	GTA	GTA	GTA	1431
GAG	GCG	GAG	GAA	GCG	GCG	GAG	GAG	GAG	GAG	GAG	GAG	GAG	TTG	AGG	CGG	GTG	GTC	CGC	CGC	CTC	1491
CTG	GGG	GGG	CGG	GTG	CTC	TGG	GTG	CGG	CGG	ACC	CGG	GAG	GAG	CGG	GAG	GCG	CCG	GAG	GAG	GAA	1551

CCC CTG AGC CAA GAC GAG ATA GGG GGT ACT GGT ATA TAA (1590)

FIG.4C



Met	ser	ala	leu	tyr	arg	arg	phe	arg	pro	leu	thr	phe	gln	glu	val	val	gly	gln	glu	20
his	val	lys	glu	pro	leu	arg	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	tyr	40
phe	ser	gly	pro	arg	gly	val	gly	lys	thr	thr	thr	ala	ala	arg	leu	ala	met	ala	val	60
gly	cys	gln	gly	glu	asp	pro	pro	cys	gly	val	cys	pro	his	cys	gln	ala	val	gln	arg	80
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	ser	asn	asn	ser	val	glu	asp	val	100
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140
glu	pro	pro	pro	his	val	leu	phe	val	phe	ala	thr	thr	glu	pro	glu	arg	met	pro	pro	160
thr	ile	leu	ser	arg	thr	gln	his	gln	arg	phe	arg	arg	leu	thr	glu	glu	glu	ile	ala	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	val	gly	arg	glu	ala	glu	glu	glu	ala	leu	leu	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	asp	ala	glu	ser	leu	leu	glu	arg	phe	220
leu	leu	leu	glu	gly	pro	leu	thr	arg	lys	glu	val	glu	arg	ala	leu	gly	ser	pro	pro	240
gly	thr	gly	val	ala	glu	ile	ala	ala	ser	leu	ala	arg	gly	lys	thr	ala	glu	ala	leu	260
gly	leu	ala	arg	arg	leu	tyr	gly	gly	glu	tyr	ala	pro	arg	ser	leu	val	ser	gly	leu	280
leu	glu	val	phe	arg	glu	gly	leu	tyr	ala	ala	phe	gly	leu	ala	gly	thr	pro	leu	pro	300
ala	pro	pro	gln	ala	leu	ile	ala	ala	met	thr	ala	leu	asp	glu	ala	met	glu	arg	leu	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	leu	glu	ala	gly	arg	ala	leu	340
ala	ala	glu	ala	leu	pro	gln	pro	thr	gly	ala	pro	ser	pro	pro	glu	val	gly	pro	lys	360
glu	ser	pro	pro	thr	pro	glu	pro	pro	arg	pro	glu	glu	ala	pro	asp	leu	arg	glu	arg	380
trp	arg	ala	phe	leu	glu	ala	ala	leu	arg	pro	thr	leu	arg	ala	phe	val	arg	glu	ala	400
pro	glu	val	arg	glu	gly	gln	leu	cys	leu	ala	phe	pro	glu	asp	lys	ala	phe	his	tyr	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	leu	pro	leu	ala	gln	ala	his	phe	gly	val	440
glu	glu	val	val	leu	val	leu	glu	gly	glu	lys	lys	ser	leu	ser	pro	pro	arg	pro	arg	460
ala	pro	pro	pro	glu	ala	pro	ala	pro	pro	gly	pro	pro	glu	glu	glu	val	glu	ala	glu	480
glu	ala	ala	glu	glu	ala	pro	glu	glu	ala	leu	arg	arg	val	val	arg	leu	leu	gly	gly	500
arg	val	leu	trp	val	arg	arg	pro	arg	thr	arg	glu	ala	pro	glu	glu	pro	glu	leu	ser	520
gln	asp	glu	ile	gly	thr	gly	thr	gly	ile											529

FIG.4D

Met	ser	ala	leu	tyr	arg	arg	phe	arg	pro	leu	thr	phe	gln	glu	val	gly	gln	glu	20	
his	val	lys	glu	pro	leu	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	tyr	leu	40
phe	ser	gly	pro	arg	gly	val	gly	lys	thr	thr	thr	ala	arg	leu	ala	met	ala	val		60
gly	cys	gln	gly	glu	asp	pro	pro	cys	gly	val	cys	pro	his	cys	gln	ala	val	gln	arg	80
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	ser	asn	asn	ser	val	glu	asp	val	100
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140
glu	pro	pro	pro	his	val	leu	phe	val	phe	ala	thr	thr	glu	pro	glu	arg	met	pro	pro	160
thr	ile	leu	ser	arg	thr	gln	his	phe	arg	phe	arg	leu	thr	thr	glu	glu	glu	ile	ala	180
phe	lys	leu	arg	arg	ile	leu	glu	ala	val	gly	arg	glu	ala	glu	glu	glu	ala	leu	leu	200
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	asp	ala	glu	ser	leu	leu	glu	arg	phe	220
leu	leu	leu	glu	gly	pro	leu	thr	arg	lys	glu	val	glu	arg	ala	leu	gly	ser	pro	pro	240
gly	thr	gly	val	ala	glu	ile	ala	ala	ser	leu	ala	arg	gly	lys	thr	ala	glu	ala	leu	260
gly	leu	ala	arg	arg	leu	tyr	gly	leu	gly	tyr	ala	pro	arg	ser	leu	val	ser	gly	leu	280
leu	glu	val	phe	arg	glu	gly	leu	gly	ala	ala	phe	gly	leu	ala	gly	thr	pro	leu	pro	300
ala	pro	pro	gln	ala	leu	ile	ala	ala	met	thr	ala	leu	asp	glu	ala	met	glu	arg	leu	320
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	leu	glu	ala	gly	arg	ala	leu	340
ala	ala	glu	ala	leu	pro	gln	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	pro	lys	pro	360
glu	ser	pro	pro	thr	pro	glu	pro	pro	arg	pro	glu	glu	ala	pro	asp	leu	arg	glu	arg	380
trp	arg	ala	phe	leu	glu	ala	leu	arg	pro	thr	leu	arg	ala	phe	val	arg	glu	ala	arg	400
pro	glu	val	arg	glu	gly	gln	leu	leu	cys	leu	phe	pro	glu	asp	lys	ala	phe	his	tyr	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	leu	pro	leu	ala	gln	ala	his	phe	gly	val	440
glu	glu	val	val	leu	val	leu	glu	glu	lys	lys	lys	pro	asp	pro	lys	ala	pro	pro	pro	460
gly	pro	thr	ser																	464

FIG.4E

Met	ser	ala	leu	tyr	arg	arg	phe	leu	pro	leu	thr	phe	gln	glu	val	gly	gln	glu	20		
his	val	lys	glu	pro	leu	leu	lys	ala	ile	arg	glu	gly	arg	leu	ala	gln	ala	tyr	leu	40	
phe	ser	gly	pro	arg	gly	val	gly	lys	thr	thr	thr	ala	arg	leu	ala	met	ala	val	60		
gly	cys	gln	gly	glu	asp	pro	pro	pro	cys	gly	val	cys	pro	his	gln	ala	val	gln	arg	80	
gly	ala	his	pro	asp	val	val	asp	ile	asp	ala	ala	ser	asn	ser	val	glu	asp	val	100		
arg	glu	leu	arg	glu	arg	ile	his	leu	ala	pro	leu	ser	ala	pro	arg	lys	val	phe	ile	120	
leu	asp	glu	ala	his	met	leu	ser	lys	ser	ala	phe	asn	ala	leu	leu	lys	thr	leu	glu	140	
glu	pro	pro	pro	his	val	leu	phe	val	phe	ala	thr	thr	glu	pro	glu	arg	met	pro	pro	160	
thr	ile	leu	ser	arg	thr	thr	gln	his	phe	arg	phe	arg	arg	leu	thr	glu	glu	ile	ala	180	
phe	lys	leu	arg	arg	ile	leu	leu	glu	ala	val	gly	arg	glu	ala	glu	glu	ala	leu	leu	200	
leu	leu	ala	arg	leu	ala	asp	gly	ala	leu	arg	asp	ala	glu	ser	leu	leu	glu	arg	phe	220	
leu	leu	leu	glu	gly	pro	leu	pro	arg	lys	glu	val	glu	arg	ala	leu	gly	ser	pro	pro	240	
gly	thr	gly	val	ala	glu	ile	ala	ala	ser	leu	ala	arg	gly	lys	thr	ala	glu	ala	leu	260	
gly	leu	ala	arg	arg	leu	tyr	gly	glu	gly	tyr	ala	pro	arg	ser	leu	val	ser	gly	leu	280	
leu	glu	val	phe	arg	glu	gly	leu	tyr	ala	ala	phe	gly	leu	ala	gly	thr	pro	leu	pro	300	
ala	pro	pro	gln	ala	ala	ile	ala	ala	met	thr	ala	leu	asp	glu	ala	met	glu	arg	leu	320	
ala	arg	arg	ser	asp	ala	leu	ser	leu	glu	val	ala	leu	leu	glu	ala	gly	arg	ala	leu	340	
ala	ala	glu	ala	leu	pro	gln	pro	thr	gly	ala	pro	ser	pro	glu	val	gly	pro	lys	pro	360	
glu	ser	pro	pro	thr	pro	glu	pro	pro	arg	pro	glu	glu	ala	pro	asp	leu	arg	glu	arg	380	
trp	arg	ala	phe	leu	glu	ala	ala	leu	arg	pro	thr	leu	arg	ala	phe	val	arg	glu	ala	arg	400
pro	glu	val	arg	glu	gly	gln	leu	leu	cys	leu	ala	phe	pro	glu	asp	lys	ala	phe	his	tyr	420
arg	lys	ala	ser	glu	gln	lys	val	arg	leu	leu	pro	leu	ala	gln	ala	his	phe	gly	val	440	
glu	glu	val	val	leu	val	leu	glu	gly	glu	lys	lys	lys	ala							454	

FIG. 4F

		ATP site	
E. coli	MSYQVLARKWRPQTFADVVGQEHVLTALANGLSLGRHHAYLFSGTRGVGKTSIARLLAK		60
H. inf.	.....K.....II.....KDN.L.....F...		60
B. sub.	....A.Y.VF...R.E.....ITKT.Q.A.LQKFS.....P.T....A.KIF...		60
C. cres.	DA.T.....Y.R..E.LI...AMVRT...AF.T...A..FMLT.V.....TT.....R		113
M. gen.	-MH..FYQ.Y..IN.KQTL...SIRKI.V.AINRDKLPNG.I...E.T...TF.KII..		59
T. th.	--VSA.Y.RF..L..QE.....KEP.LKAIRE..LAQ.....P.....TT.....M		58

	Zn <sup>++</sup> finger	
E. coli	GLNCET----	116
H. inf.	....VH-----V.....E.E..KA....N.I.....E.....K.V	116
B. sub.	AV...H----APVDE..NE.AA.KG.TN.SIS.V.....NNG.DEI..IR.K.KF..S	116
C. cres.	A..Y..DTVK.PSVDLTTEGYH..S.IE..HM.VL.L.....DEM.E..G.R...V	173
M. gen.	AI..LN-----WDQIDV.NS..V.KS.NTNSAI.IV.....KNGIN.I.E.VE..FNH.F	115
T. th.	AVG.QG-----EDP.....PH.QAVQR.AHP.VVD.....NNS...V.E.RERIHL..L	112

E. coli	RGRFKVYLIDEVHMLSRHSFNALLKTLLEPPPEHVKFLLATDPQKLPVTILSRCLQFHLK	176
H. inf.	V.....I.....IGA.....CI.I...E.H.I.L.I...QR.DF.	176
B. sub.	EA.Y...I.....TAA.....P.A..IF...EIR.V.....QR.D.R	233
C. cres.	TFKK...IL..A...TTQ.WGG.....S.PY.L.IFT..EFN.I.L.....QS.FF.	175
M. gen.	SAPR..FIL..A...KSA.....P..L.VF...E.ERM.P.....TQH.RFR	172
T. th.		

FIG.5A

E.coli	ALDVEQIRHQLEHILNEEHIAHEPRALQLLARAEEGSLRDALSLTDQAIASGDQ--VST	234
H.inf.	...ET..SQH.A...TQ.N.PF.DP..VK..K..Q..I..S.....M..R.--.TN	234
B.sub.	RTSQA.VGRMNK.VDA.QLQV.EGS.EII.S..H.GM.....L.....SFSGDI--LKV	234
C.cres.	RVEPDVLVKHFD.R.SAK.GARI.MD..A.I.....V..G...L.....VQTERGQT.TS	293
M.gen.	KITSDL.LER.ND.AKK.K.KI.KD..IKI.DLSQ.....G...L..LAI.LIVKKL.LL	235
T.th.	R.TE.E.AFK.RR..EAVGRE.A.EE..L....L.D.A....E..LERFLLLEGP---LTR	229
E.coli	QAVSAMLGTLDDQALSIVEAMVEANGERVMA LINEAAARGIEWEALLVEMGLLHRIAM	294
H.inf.	NV..N...L...NYSVDILY.LHQG...LL.RTLQRV.DAAGD.DK..G.CAEK...Q..L	294
B.sub.	EDALLIT.AVSQLYIGK.AKSLHDK.VSDALETL..LLQQ.KDPAK.IED.IFYFRDMLL	294
C.cres.	TV.RD...LA.RS.TIA.Y.HVMAGKTKDALEGFRALWGF.ADPVVMLDV.DHC.AS.V	353
M.gen.	MLKKHLISLIEMQN.L.L.KQFYQ.I	260
T.th.	KE.ERA..SPPGTGVAEIAASLARGKTA.EALG.ARRLYGE.YAPRS.VSGL.EVFREGLY	289

FIG.5B

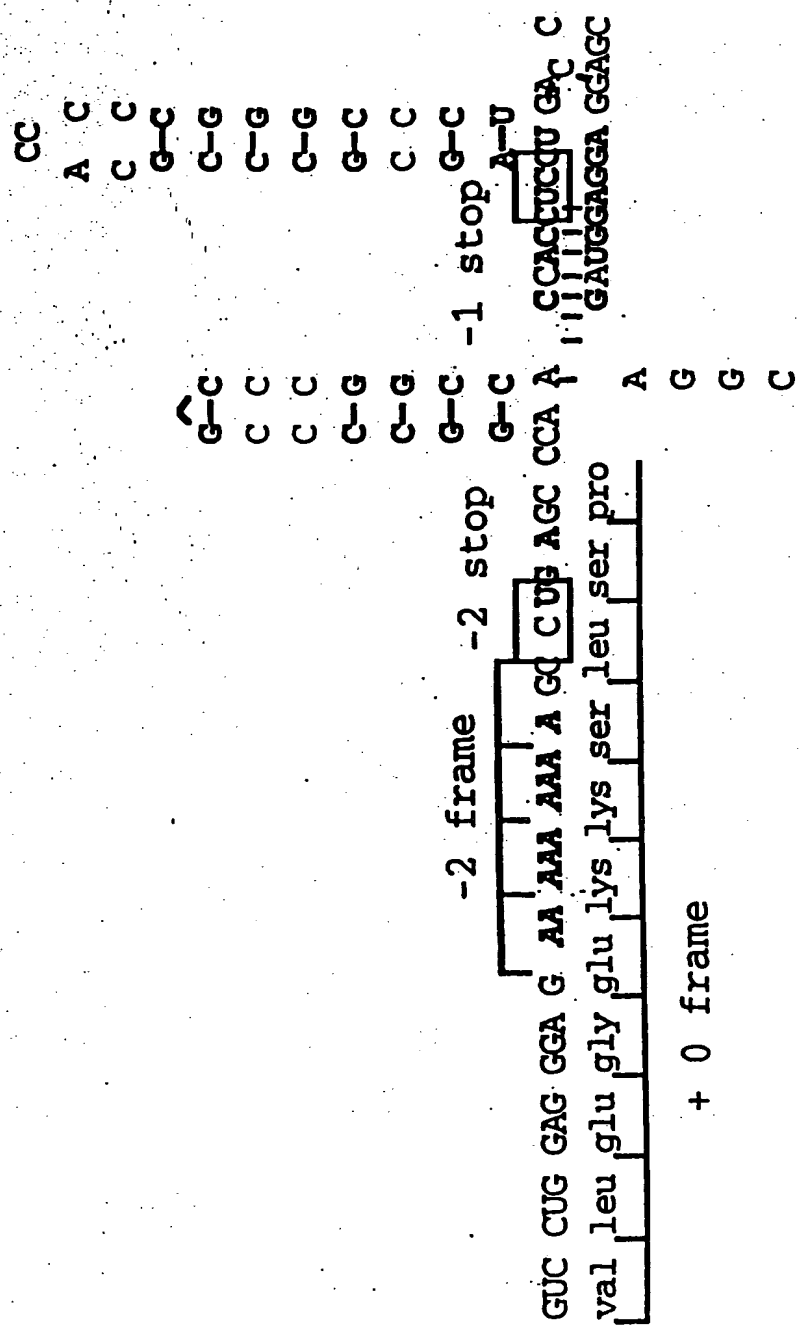


FIG.6

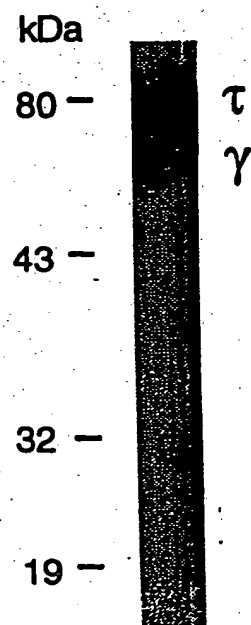
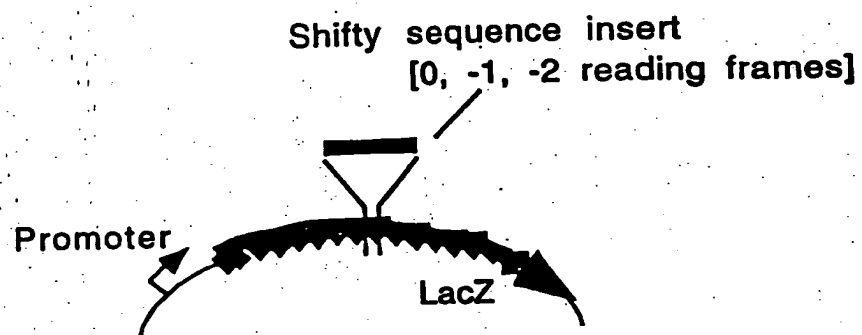


FIG.7

# FIG.8A



	Reading frame	Blue	White
Shifty sequence	0	+	
	- 1	+	
	- 2	+	
Mutant sequence	0	++	
	- 1		+
	- 2		+

# FIG.8B



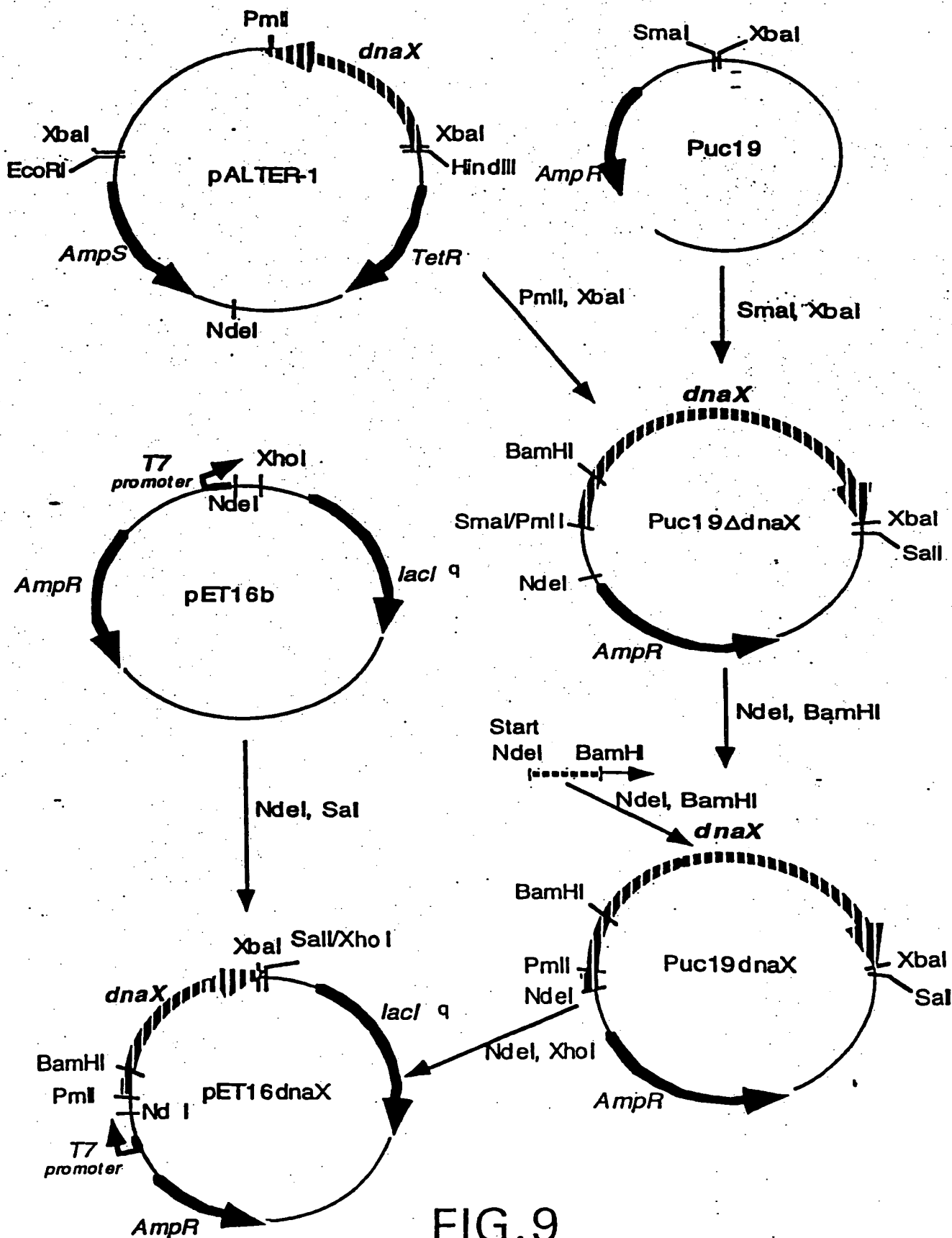


FIG.9

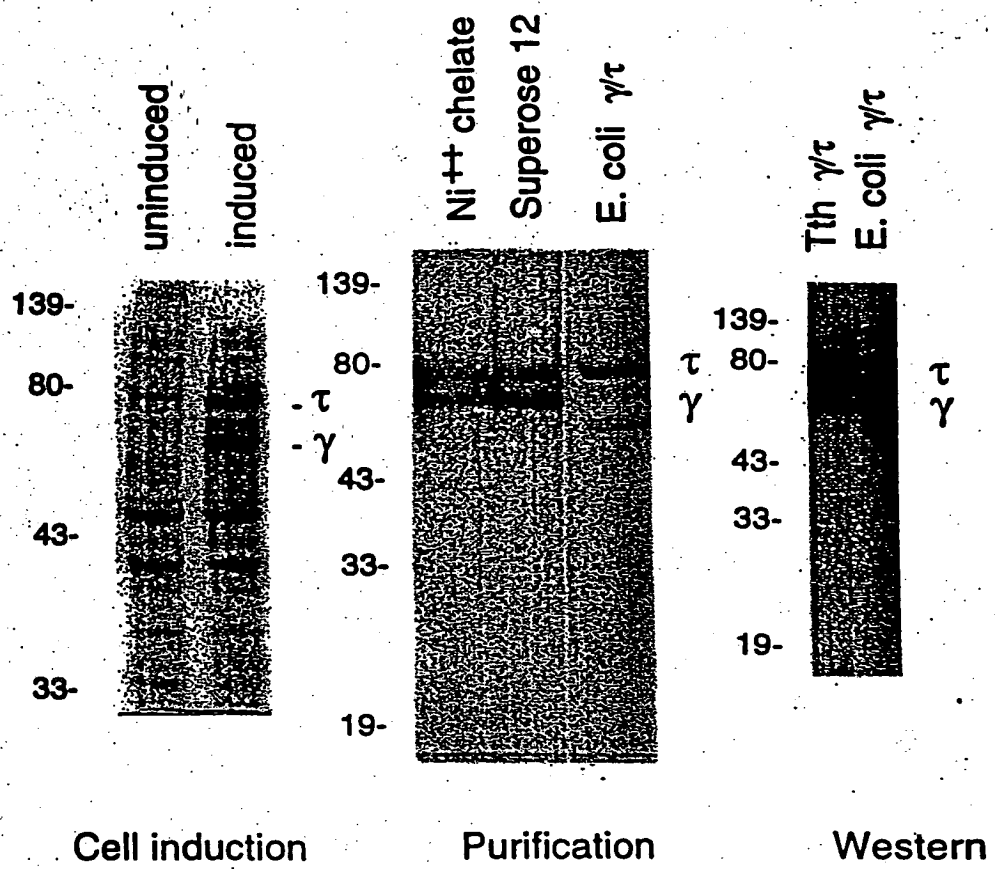


FIG.10A    FIG.10B    FIG.10C

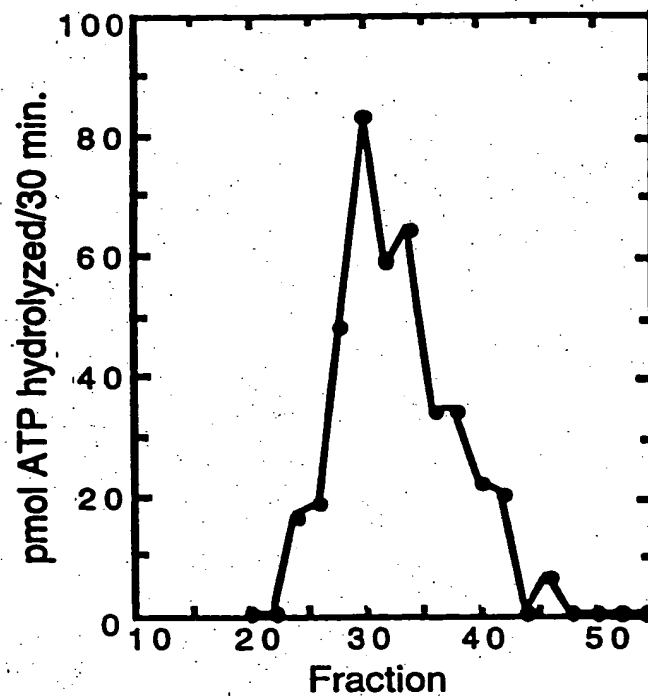


FIG. 11A

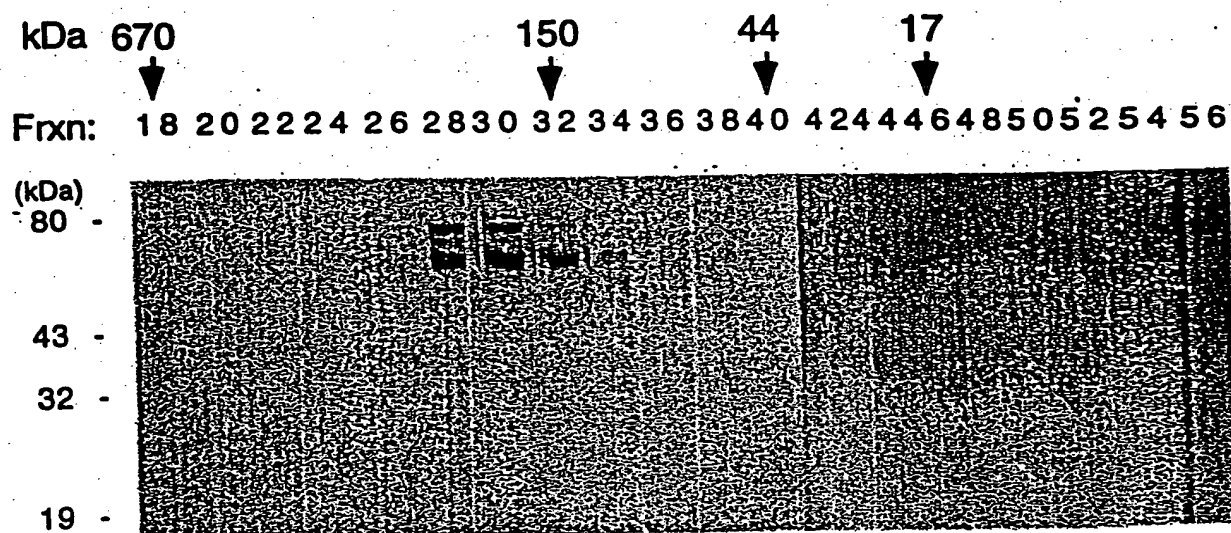


FIG. 11B

FIG.12A

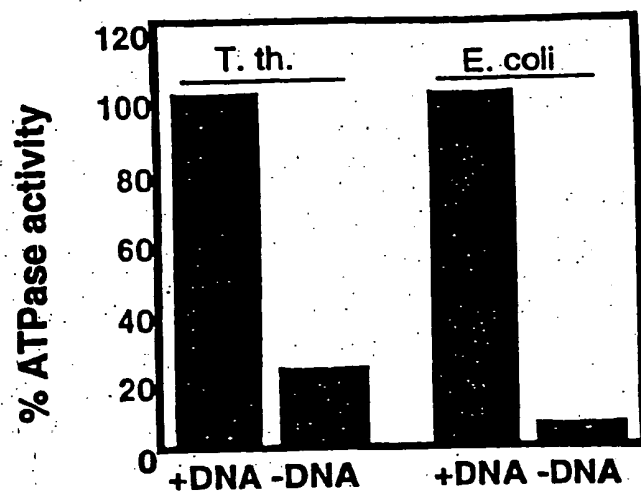


FIG.12B

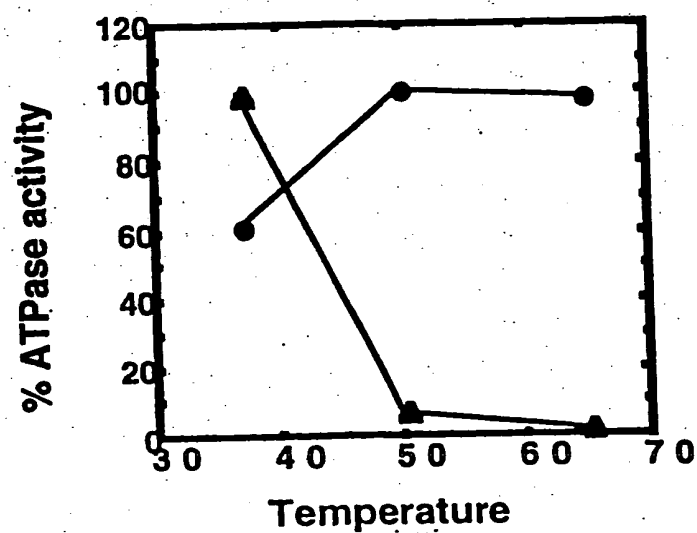
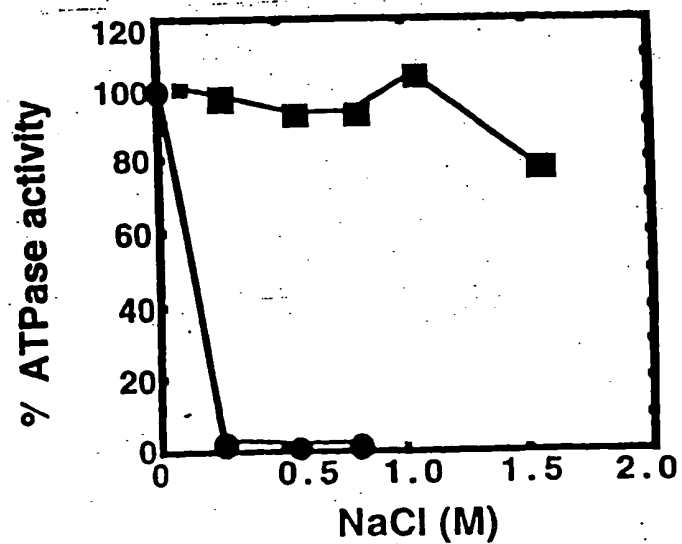
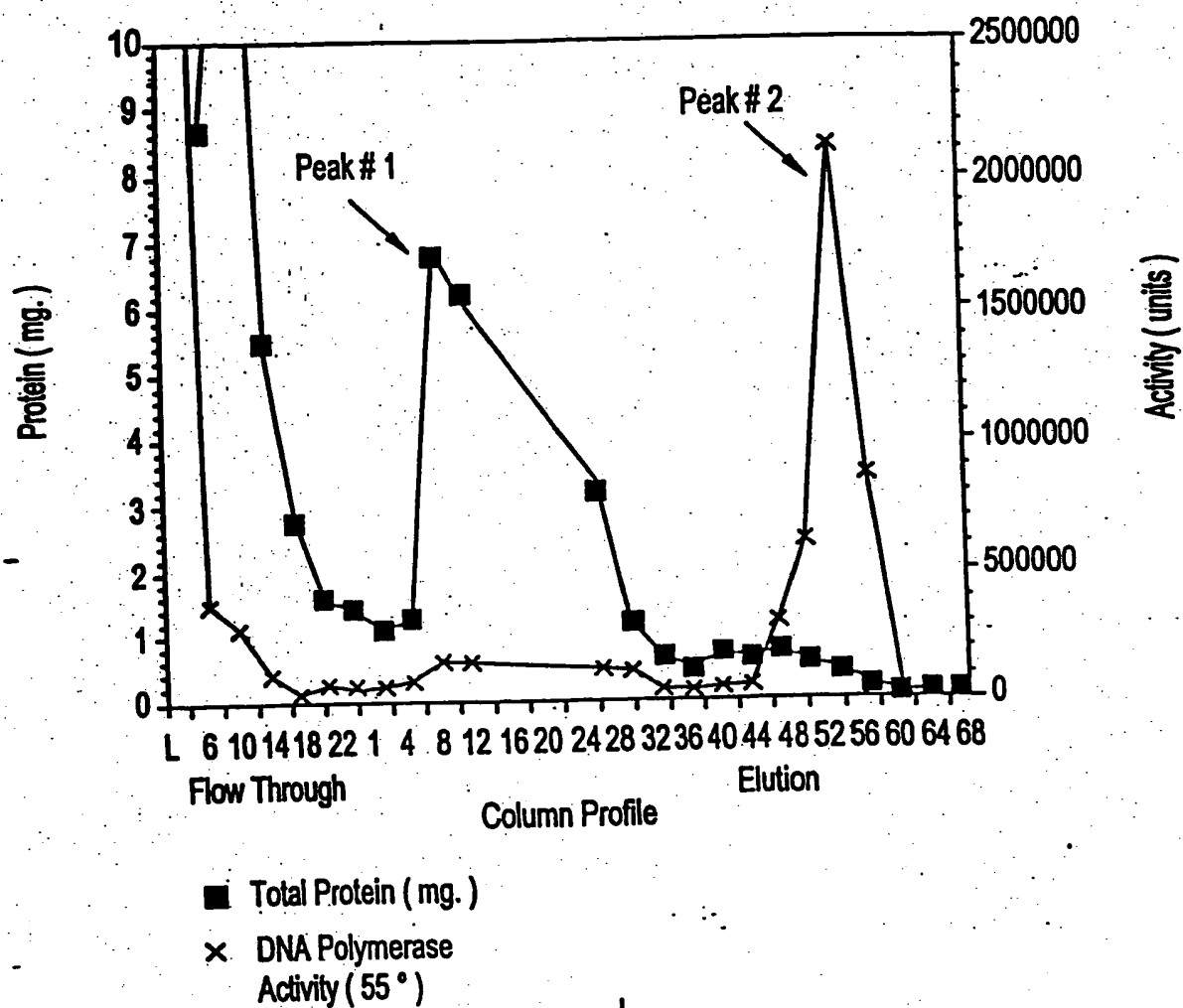


FIG.12C



# FIG.13A



# FIG.13B

ATP Agarose Step Column

FIG.13C

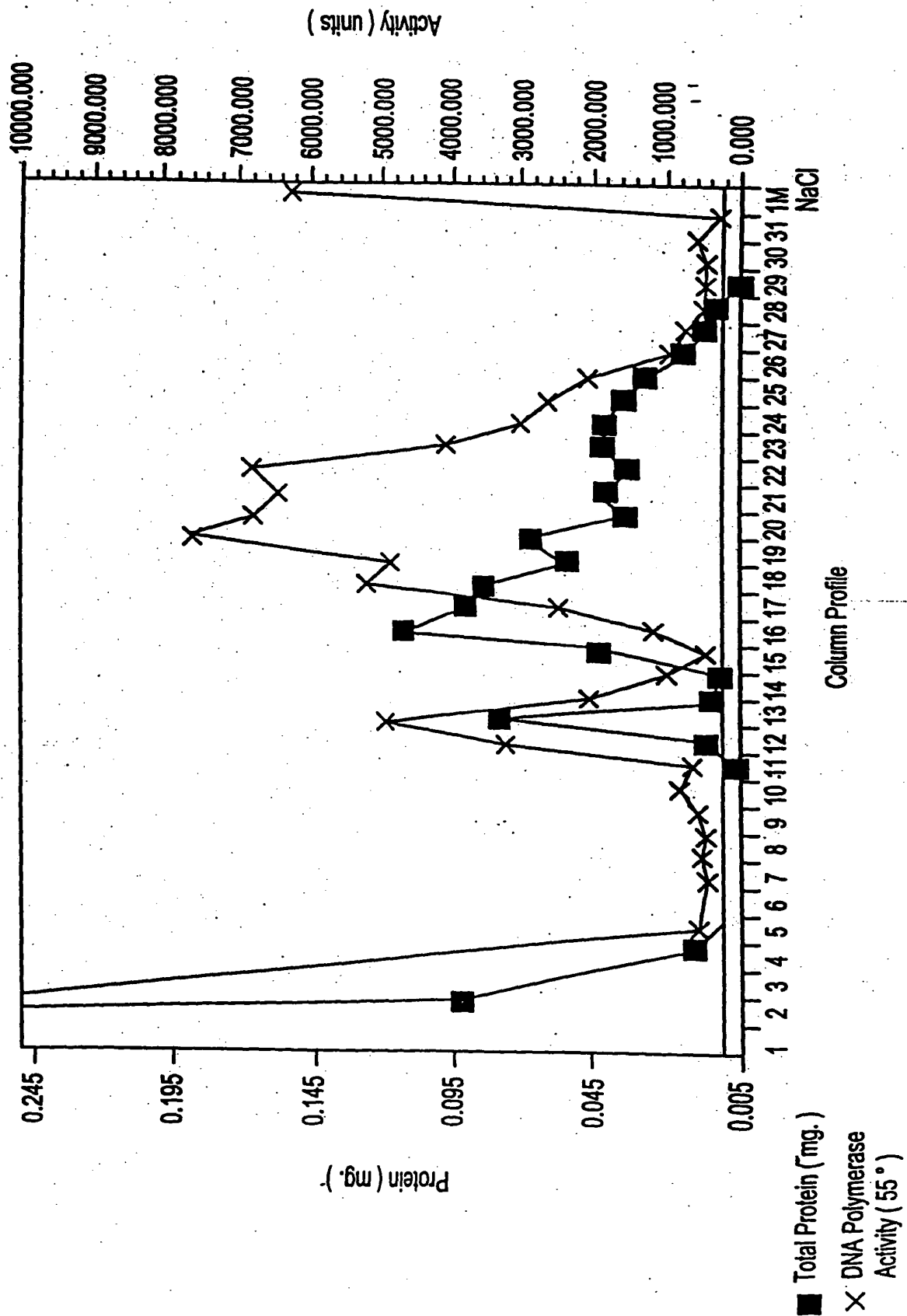
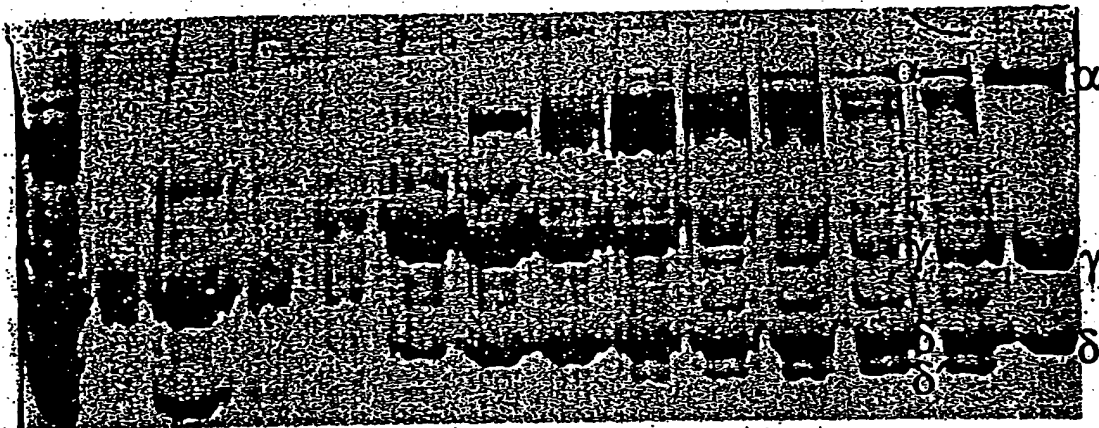


FIG.14A

load FT 9 10 11 12 13 14 15 16 17 18 19  $E. coli$   
 $\alpha$   $\gamma$   $\delta$



↑ ↑  
 T.th E. coli  
 subunits subunits

FIG.14B

load FT 9 10 11 12 13 14 15 16 17 18 19



Alignment of TTH1 with alphas subunits of other organisms.

E.coli	DRYFLELIRTPDEESYLHAAVELAEARGLPVV	197	(ID#72)
V.chol.	DHFYLELIRTPGRADEESYLHFALDVAEQYDLPVV	197	(ID#73)
H.inf.	DHFYALSRTPGRPNEERYIQALKLAERCDDLPLV	197	(ID#74)
R.prow.	DRFYFEIMRHDLPREEQFIENSYIQIASELSIPIV	195	(ID#75)
H.pyl.	DDFYLEIMRHGILDQRFIDEQVIKMSLETGLKII	213	(ID#76)
S.sp.	DDYYLEIQDHGSVEDRLVNINLVKIAQELDIKIV	202	(ID#77)
M.tub.	DNYFLELMDHGLTIERRVRDGLLEIGRALNIPPL	220	(ID#78)
T.th.	FFIEIQNHGLSEQK		(ID#61)

## FIG.15A

Alignment of TTH2 with alphas subunits of other organisms.

E.coli	NKRRAKNGEPPLDIAAIPLDDKKSFMDLQRSETTAVFQLESRGMKD	618	(ID#79)
V.chol.	NPRLKKAGKPPVRIEAIPLDDARSFRNLQDAKTTAVFQLESRGMK	618	(ID#80)
H.inf.	NVRMVRGKPRVDIAAIPLDDPESFELLKRSETTAVFQLESRGMKD	618	(ID#81)
R.prow.	CKLLLEQGIKIDFDDMTFDDKKTYQMLCKGKGVGFQFESIGMKD	624	(ID#82)
H.pyl.	LKIITQHKISVDFLSLMDDPKVYKTIQSGDTVGFQIES-GMFQ	648	(ID#83)
S.sp.	QERKALQIRARTGSKKLPDDVKKTHKLLLEAGDLEGIFQLESQGMKQ	643	(ID#84)
M.tub.	IDNVRANRGIDLDLESVPLDDKATYELLGRGDTLGVFQLDGGPMRD	646	(ID#85)
T.th.	RVELDYDALTLDD		(ID#60)

## FIG.15B



ATGGGCCGGGAGCTCCGCTTCGCCCACCTCCACCAGCACA	
CCCAGTTCTCCCTCCTGGACGGGGCGGCGAAGCTTTCCGA	120
CCTCCTCAAGTGGGTCAAGGAGACGACCCCGAGGACCC	
GCCTTGGCCATGACCGACCACGGCAACCTCTTCGGGGCCG	240
TGGAGTTCTACAAGAAGGCCACCGAAATGGGCATCAAGCC	
CATCCTGGGCTACGAGGCCTACGTGGCGGCGGAAAGCCGC	360
TTTGACCGCAAGCGGGGAAAGGGCCTAGACGGGGGCTACT	
TTACCTCACCTCCTCGCCAAGGACTTCACGGGGTACCA	480
GAACCTGGTGCCTGGCGAGCCGGGCTTACCTGGAGGGG	
TTTTACGAAAAGCCCCGGATTGACCGGGAGATCCTGCGCG	600
AGCACGCCGAGGGCCTCATCGCCCTCTCGGGGTGCCTCGG	
GGCGGAGATCCCCAGTTTCATCCTCCAGGACCGTCTGGAC	720
CTGGCCGAGGCCCGGCTCAACGAGTACCTCTCCATCTTCA	
AGGACCGCTTCTTCATCGAGATCCAGAACCACGGCCTCCC	840
CGAGCAGAAAAGGTCAACGAGGTCTCAAGGAGTTTCGCC	
CGAAAGTACGGCCTGGGGATGGTGGCCACCAACGACGGCC	960
ATTACGTGAGGAAGGAGGACGCCCGCGCCACGAGGTCTT	
CCTCGCCATCCAGTCCAAGAGCACCTGGACGACCCCGGG	1080
CGCTGGCGCTTCCCCTGCGACGAGTTCTACGTGAAGACCC	
CCGAGGAGATGCGGGCCATGTTCCCCGAGGAGGAGTGGGG	1200
GGACGAGCCCTTTGACAACACCGTGGAGATCGCCCGCATG	
TGCAACGTGGAGCTGCCCATCGGGGACAAGATGGTCTACC	1320
GAATCCCCCGCTTCCCCCTCCCCGAGGGGCGGACCGAGGC	
CCAGTACCTCATGGAGCTCACCTTCAAGGGGCTCCTCCGC	1440
CGCTACCCGGACCGGATCACCGAGGGCTTCTACCGGGAGG	
TCTTCCGCCTTTTGGGGAAGCTTCCCCCCCACGGGGACGG	1560
GGAGGCCTTGGCCGAGGCCTTGGCCCAGGTGGAGCGGGAG	
GCTTGGGAGAGGCTCATGAAGAGCCTCCCCCTTTGGCCG	1680
GGGTCAAGGAGTGGACGGCGGAGGCCATTTTCCACCGGGC	
CCTTTACGAGCTTTCGGTGATAGAGCGCATGGGGTTTCCC	1800
GGCTACTTCCTCATCGTCCAGGACTACATCAACTGGGCCC	
GGAGAAACGGCGTCTCCGTGGGGCCCCGGCAGGGGGAGCGC	
CGCCGGGAGCCTGGTGGCCTACGCCGTGGGGATCACCAAC	
ATTGACCCCTCCGCTTCGGCCTCCTCTTTGAGCGCTTCC	
TGAACCCGGAGAGGGTCTCCATGCCCCGACATTGACACGGA	
CTTCTCCGACCGGGAGCGGGACCGGGTGATCCAGTACGTG	
CGGGAGCGCTACGGCGAGGACAAGGTGGCCCAGATCGGCA	
CCCTGGGAAGCCTCGCCTCCAAGGCCGCCCTCAAGGACGT	
GGCCCGGGTCTACGGCATCCCCACAAGAAGGCGGAGGAA	
TTGGCCAAGCTCATCCCGGTGCAGTTTCGGGAAGCCCAAGC	
CCCTGCAGGAGGCCATCCAGGTGGTGCCGGAGCTTAGGGC	
GGAGATGGAGAAGGACCCCAAGGTGCGGGAGGTCTCGAG	
GTGGCCATGCGCCTGGAGGGCCTGAACCGCCACGCCTCCG	
TCCACGCCGCCGGGGTGGTGATCGCCGCCGAGCCCCTCAC	
GGACCTCGTCCCCCTCATGCGCGACCAGGAAGGGCGGCCC	
GTCACCCAGTACGACATGGGGGCGGTGGAGGCCTTGGGGC	
TTTTGAAGATGGACTTTTGGGCCTCCGCACCCTCACCTT	

FIG. 16A

CCTGGACGAGGTCAAGCGCATCGTCAAGGCGTCCCAGGGG	1920
GTGGAGCTGGACTACGATGCCCTCCCCCTGGACGACCCCA	
AGACCTTCGCCCTCCTCTCCCGGGGGGAGACCAAGGGGGT	2040
CTTCCAGCTGGAGTCGGGGGGGATGACCGCCACGCTCCGC	
GGCCTCAAGCCGCGGCGCTTTGAGGACCTGATCGCCATCC	
TCTCCCTCTACCGCCCCGGGCCCATGGAGCACATCCCCAC	2160
CTACATCCGCCGCCACCACGGGCTGGAGCCCGTGAGCTAC	
AGCGAGTTTCCCCACGCCGAGAAGTACCTAAAGCCCATCC	
TGGACGAGACCTACGGCATCCCCGTCTACGAGGAGCAGAT	2280
CATGCAGATCGCCTCGGCCGTGGCGGGGTACTCCCTGGGC	
GAGGCGGACCTCCTGCGGCGGTCCATGGGCAAGAAGAAGG	
TGGAGGAGATGAAGTCCACCGGGAGCGCTTCGTCCAGGG	2400
GGCCAAGGAAAGGGGCGTGCCCCGAGGAGGAGGCCAACCGC	
CTCTTTGACATGCTGGAGGCCTTCGCCAACTACGGCTTCA	
ACAAATCCCACGCTGCCGCCTACAGCCTCCTCTCCTACCA	2520
GACCGCTACGTGAAGGCCCACTACCCCGTGAGTTCATG	
GCCGCCCTCCTCTCCGTGGAGCGGCACGACTCCGACAAGG	
TGGCCGAGTACATCCGCGACGCCCGGGCCATGGGCATAGA	2640
GGTCCTTCCCCCGGACGTCAACCGCTCCGGGTTTGACTTC	
CTGGTCCAGGGCCGGCAGATCCTTTTCGGCCTCTCCGCGG	
TGAAGAACGTGGGCGAGGCGGCGGCGGAGGCCATTCTCCG	2760
GGAGCGGGAGCGGGGCGGCCCTACCGGAGCCTCGGCGAC	
TTCTCAAGCGGCTGGACGAGAAGGTGCTCAACAAGCGGA	
CCCTGGAGTCCCTCATCAAGGCGGGCGCCCTGGACGGCTT	2880
CGGGGAAAGGGCGCGGCTCCTCGCCTCCCTGGAAGGGCTC	
CTCAAGTGGGCGGCCGAGAACCAGGAGAAAGGCCCGCTCGG	
GCATGATGGGCCTCTTCAGCGAAGTGAGGAGCCGCCTTT	3000
GGCCGAGGCCGCCCCCTGGACGAGATCACCCGGCTCCGC	
TACGAGAAGGAGGCCCTGGGGATCTACGTCTCCGGCCACC	
CCATCTTGCGGTACCCCGGGCTCCGGGAGACGGCCACCTG	3120
CACCTGGAGGAGCTTCCCCACCTGGCCCGGGACCTGCCG	
CCCCGGTCTAGGGTCCTCCTTGCCGGGATGGTGGAGGAGG	
TGGTGCGCAAGCCCAAAAGAGCGGCGGGATGATGGCCCG	3240
CTTCGTCTCTCCGACGAGACGGGGGCGCTTGAGGCGGTG	
GCATTGGCCGGGCCTACGACCAGGTCTCCCCGAGGCTCA	
AGGAGGACACCCCCGTGCTCGTCCTCGCCGAGGTGGAGCG	3360
GGAGGAGGGGGGCGTGCGGGTGCTGGCCCAGGCCGTTTGG	
ACCTACGAGGAGCTGGAGCAGGTCCCCCGGGCCCTCGAGG	
TGGAGGTGGAGGCCTCCCTCCTGGACGACCGGGGGGTGGC	3480
CCACCTGAAAAGCCTCCTGGACGAGCACGCGGGGACCCTC	
CCCCTGTACGTCCGGGTCCAGGGCGCCTTCGGCGAGGCC	
TCCTCGCCCTGAGGGAGGTGCGGGTGGGGGAGGAGGCTGT	3600
AGGCGGCCGCGTGGTTCCGGGCCTACCTCCTGCCCGACCG	
GGAGGTCCTTCTCCAGGGCGGCCAGGCGGGGGAGGCCAG	
GAGGCGGTGCCCTTCTAGGGGGTGGGCCGTGAGACCTAGC	3720
GCCATCGTTCTCGCCGGGGCAAGGAGGCCTGGGCCCGAC	
CCCTTTTGG	

FIG. 16B

MGRELRF AHLHQHTQFSLLDGAPKLSDLLKWVEETTPEDP	
ALAMTDHGNLFGAVEFYKKATEMGIKPILGYEAYVAESR	
FDRKRGKGLDGGYFHLTLLAKDFTGYQNLVRLASRAYLEG	120
FYEKPRIDREILREHAEGLIASGCLGAEIPQFILQDRLD	
LAEARLNEYLSIFKDRFFIEIQNHGLPEQKKVNEVLKEFA	
RKYGLGMVATNDGHYVRKEDARAHEVLLAIQSKSTLDDPG	240
ALALPCEEFYVKTPEEMRAMFPPEEEVGGRSPLTTPWRSPH	
VORGAAIGTRWSTRI PRFPLPEGRTEAQYLMELTFKGLLR	
RYPDRITEGFYREVFRLSGKLPPHGDGEALAEALAQVERE	360
AWERLMKSLPPLAGVKEWTAEAI FHRALYELSAIERMGFP	
GLLPHRPGHLHQLGPEKGVSVGPGRGGAAGSLVAYAVGITN	
IDPLRFGLL FERFLNPERVSMPDIDTDFSDRERDRVIQYV	480
RERYGEDKVAQIGTLGSLASKAALKEVARVYGI PRKKAEE	
LAKLIPVQFGKPKPLQEAIQVVP ELRAEMEKDPKVREVL	
VAMRLEGLNRHASVHAGRGGVFSEPLTDLVPLCATRKGGP	600
YTQYDMGAVEALGLLKMDFLGLRTLTLFLDEVKRIVKASQG	
VELDYDALPLDDPKTFALLSRGETKGVFQLESGGMTATLR	
GLKPRRFEDLIAILSLYRPGPMEHIPTYIRRHGGLPVS	720
SEFPHAEKYLKPILDETYGIPVYQEQIMQIASAVAGYSLG	
EADLLRRSMGKKKVEEMKSHRERFVQAKERGVPPEEEANR	
LFDMLEAFANYGFNKSHAAAYSLLSYQTAYVKAHPVEFM	840
AALLSVERHDSKVAEYIRDARAMGIEVLPPDVNRSGFDF	
LVQGRQILFGLSAVKNVGEAAAEAILRERERGGPYRSLGD	
FLKRLDEKVLNKR TLES LIKAGALDGFGERARLLASLEGL	960
LKWAAENREKARSGMMGLFSEVEEPPLAEAAPLDEITRLR	
YEKEALGIYVSGHPILRYPGLRETATCTLEELPHLARDLP	
PRSRVLLAGMVEEVVRKPTKSGGMMARFVLSDETGALEAV	1080
AFGRAYDQVSPRLKEDTPVLVLAEVEREEGGVRVLAQAVW	
TYQELEQVPRALEVEVEASLPDDRGV AHLKSLLDEHAGTL	
PLYVRVQGA FG EALLALREVRVGEEALGALEAAGFPAYLL	1200
PNREVSPRLTGSGGPRGRALSTGLALKTYPIALPGGNEAL	
ARPLL	

FIG. 16C

	Start1	Start2	3'-Exo I
T.th.	VERVVRTLLDGRFLLEEGVGLWENRYFPFLEGEAVVLDLETTGLAG-----LDEVIEVGLLRLEGG---RRLPF		
D.rad.		PWPQDVVVFDFLETTGSPA-----SAAIVEIGAVRIVGGQIDETLKF	
Bac.sub.	HGIKMIYMEANLVDDGVPIAYNAAHRLLEEETVVFDFVETTGLSAV-----YDTIIELAAVKVKGGE---IIDKF		
H.inf.		MINPNRQIVLDTETTGMNQLGAHYEGHCHIEIGAVELINRR-YTGNNX	
E.c.		MSTAITRQIVLDTETTGMNQIGAHSEGHKIIIEIGAVEVNNRR-LTGNNF	
H.py1.	NLEYLKACGLNFIEETSENLTITLKNLKTPLKDEVFSFIDLETTGSCPI-----KHEILLEIGAVQVKGGE---IINRF		

	3'-Exo II
T.th.	QSLVR-PLPP---AEARSWNLT---GIPREALEEAPSLEEVLEKAYPLRGDATLVIHNAAFDLGFL-RPALEGLG
D.rad.	ETLVR-PTRPDGSMLSIPWQQRVHGISDEMVRRAPAKDVLPDFDFVDGSAAVVAHNVSFDGGFM-RAGAERLG
Bac.sub.	EAFAN-PHRP---LSATIIELT---GITDDMLQDAPDVVDVIRDFREWIGDDILVAHNASFDMGFL-NVAYKKLL
H.inf.	HIYIK-PDRP---XDPDAIKVH---GITDEMLADKPEFKEVAQDFLDYINGAELLIHNAFPDVGFM-DYEFKLN
E.c.	HVYLK-DRLV---DPEAFGVH---GIAVDFLLDKPTFAEVAVEFMDYIRGAELVIHNAAFDIGFM-DYEFSLLK
H.py1.	ETLVKVKVSP-----DYIAELT---GITYEDTLNAPSAHEALQELRLFLGNSVFVAHNANFDYNFLGRYFVEKLH

	3'-Exo IIIC
T.th.	-----YRLENPVVDSLRLARRGLPGLRRYGLDALSEVLELPRRT--CHRALEDVERTLAVVHEVYVYMLT-----SG
D.rad.	-----LSWAPERELCTMQLSRRAFPFRERTHNLTVLAERLGLEFAPGGRHSYGDVQVTAQAYLRLLLELLG-----ER
Bac.sub.	E----VEKAKNPVIDTLELGRFLYPEFKNHRLNTLCKKFDIELTQ--HHRAIYDTEATAYLLKMLKDAA-----EK
H.inf.	-LNVKTDDICLVTDTLQMARQMPGKRN-NLDALCDRLGIDNSKRTLHGALLDAEILADVYLMMTGGQTNLFDEEE
E.c.	RDIAKTNTFCVKVTDLSLAVARKMFPGKRN-SLDALCARYEIDNSKRTLHGALLDAQILAEVYLAMTGGQTSMAFAME
H.py1.	-----CPLNLNKLCTDLSKRAILSMRY-SLSFLKELLGFGIEV--SHRAYADALASYKLFEICLLNLP--SYIKT

FIG.17

## FIG.18A

ATGGTGGAGCGGGTGGTGCGGACCCTTCTGGACGGGAGGT 40  
TCCTCCTGGAGGAGGGGGTGGGGCTTTGGGAGTGGCGCTA  
CCCCTTTCCCCTGGAGGGGGAGGCGGTGGTGGTCTTGAC 120  
CTGGAGACCACGGGGCTTGCCGGCCTGGACGAGGTGATTG  
AGGTGGGCCTCCTCCGCCTGGAGGGGGGAGGCGCCTCCC 200  
CTTCCAGAGCCTCGTCCGGCCCCCTCCCGCCCGCCGAAGCC  
CGTTCGTGGAACCTCACCGGCATCCCCGGGAGGCCCTGG 280  
AGGAGGCCCCCTCCCTGGAGGAGGTTCTGGAGAAGGCCTA  
CCCCCTCCGCGGCGACGCCACCTTGGTGATCCACAACGCC 360  
GCCTTTGACCTGGGCTTCCTCCGCCCCGCCTTGGAGGGCC  
TGGGCTACCGCCTGGAAAACCCCGTGGTGGACTCCCTGCG 440  
CTTGGCCAGACGGGGCTTACCAGGCCTTAGGCGCTACGGC  
CTGGACGCCCTCTCCGAGGTCCTGGAGCTTCCCCGAAGGA 520  
CCTGCCACCGGGCCCTCGAGGACGTGGAGCGCACCCCTCGC  
CGTGGTGCACGAGGTATACTATATGCTTACGTCCGGCCGT 600  
CCCCGCACGCTTTGGGAACTCGGGAGGTAG

MVERVVRTLLDGRFLLEEGVGLWEWRYPFPLEGEAVVVD 40  
LETTGLAGLDEVIEVGLLRLEGGRRLPFQSLVRPLPPAEA  
RSWNLTGIPREALEEAPSLEEVLKAYPLRGDATHVIHNA 120  
AFDLGFLRPALEGLGYRLENPVVDSLRLARRGLPGLRRYG  
LDALSEVLELPRRTCHRALEDVERTLAVVHEVYYMLTSGR 200  
PRTLWELGRZ

## FIG.18B

# Alignment of dnaA genes.

P. mar.	MLEASWEK VQSSL--KQNL SK--	-----PSYE TWIRPTEFSG--FKN	GELTLIAPNSFSSAW	LKNYSQTIQETAE-	65
Syn. sp.	MVSCENLWQQ ALAIL--ATQLTK--	-----PAFD TWIKASVLIS--LGD	GVATIOVENGFVLNH	LQKSYGPLIMEVLT-	67
B. sut.	MENILDLMNQ ALAQI--EKQLSK--	-----PSFE TWKSTKAHS--LQG	DTLTITAPNEFARDW	LESRYLHLIADTIY-	67
M. tub.	MTDDPGSGFTTWNA VSEINGDKVDDGP	SSDANLSAPLTPOOR	AMNLVQPLT--IVE	GFALLSVPSFVQNE	87
T. th.	MSHEAVWQH VLEHI--RRSITE--	-----VEFH TWFERIRPLG--IRD	GVLELAVPTSFALDW	IRRHVAGLIQEGPR-	66
E. coli	MSLSLWQQ CLARL--QDELPA--	-----TEFS MWIRPLQAE--LSD	NTLALYAPNRFVLW	VRDKYLIANNINGLLT-	64
T. mar.	MKER ILQEI--KTRVNR--	-----KSWE LMFSSFDVKS--IBG	NKVFSVGNLFKEW	LEKKYYSVL SKAVK-	61
H. pyl.	MDTNNNIEKE ILALVKQNPKVSL--	-----IEYE NYFSQLKYNPENASKS	DIAFFYAPNQVLCTT	ITAKYGALLKEILSQ	72
P. mar.	EIFG---EPVTVHVK VKANAESSDEHYSSA P	-----ITPPLEASPGSV	DSSGSSLRLSK----	-KTLPLLLNLRYVFNR	130
Syn. sp.	DLTG---QEITVKLI TDGLEPHS---LIGQ E	-----SSLPMETTP----	-----	-KNATALNGKYTFSR	115
B. sut.	ELTG---EELSIFV IPQNQDVEDFMPKPQ	VKKAVKEDTSDFPQN	-----	-----MLNPKYTFDT	119
M. tub.	RRLGH-QIQLGVRIA PPATDEADDTTVPPS	ENPATTSPDTTND	EIDDSAAARGDNQHS	WPSYFTERPHNIDSA	176
T. th.	LLGAQ-APRFELRVV PGWVQEDIFOPPPS	PPAQAP-----	-----	-----EDTFKT	108
E. coli	SFCGADAPQLREFVG TKPVTQTPQAAVTSN	VAAPAQVAQTQPORA	APSTRSGMDNV PAPA EP	-----	140
T. mar.	VVLG---NDATFEIT YEAFEPHSSYSEPLV	KRAVLLTP-----	-----	-----LNPDYTFEN	106
H. pyl.	NKVG-MHLAHSVDVR IEVAPKIQINAQSN I	NYKAITS-----	-----	-----VKDSYTFEN	118
P. mar.	FVVGPNRMAHAAAM AVAESPGREENPLFI	CGGVGLGKTHLMQAI	GHYRLEIDFGAKVSY	VSTETFTNDLIL--A	217
Syn. sp.	FVVGPTNRMAHAASL AVAESPGREENPLFL	CGGVGLGKTHLMQAI	AHYRLEMYPNNAKVY	VSTERFTNDLIT--A	202
B. sut.	FVIGSGNRFAHAASL AVAEAPAKAVNPLFI	YGGVGLGKTHLMHAI	GHYVIDHNPSAKVY	LSSEKFTNEFIN--S	206
M. tub.	FVIGASNRFHAHAAL AIAEAPARAVNPLFI	WGESGLGKTHLLHAA	GNYAQRLFPGMRVKY	VSTEEFTNDFIN--S	263
T. th.	SWMGPTTPWPHGGAV AVAESPGRAVNPLFI	YGGRGLGKTYL MHAV	GPLRAKRFPHMRLEY	VSTETFTNELLNRP S	196
E. coli	FVEGKSNQ LARAAAR QVADNPGGAVNPLFL	YGGTGLGKTHLLHAV	GNIGMARKPNNAKVY	MHSERFVQDMVK--A	227
T. mar.	FVVGPGNSFAYTHAAL EVAKHPGR--VNPLFI	YGGVGLGKTHLLQSI	GNVWQNEPDLRVMY	ITSEKFLNDLVD--S	193
H. pyl.	FVVGSCNNTVYEIAK KVAQSDTPPVNPNVLF	YGGTGLGKTHILNAI	GNHALEK--HKKVVL	VTSEDFLTDFLK--H	203

FIG. 19A

P. mar. AADLILVDDIQFIEG KEYTQEEFFHTFNAL HDAGSQIVLASDRPP SQIPRLQERLMSRFS MGLIADVQAPDLETR MAILQKKAHERVGL 307  
 Syn. sp. SADFLILLDDIQFIKG KEYTQEEFFHTFNLSL HEAGKQVWVASDRAP QRIFGLQDRLLSRFS MGLIADIQVPDLETR MAILQKKAHEYDRIRL 292  
 B. sut. NVDVLLIDDDIQFLAG KEQTQEEFFHTFNIL HEESKQIVISSDRPP KEIPTLEDRLRSRFE WGLITDITPPDLETR IAILRKKAKAEGLDI 296  
 M. tub. DVDVLLVDDIQFIEG KEGIQEEFFHTFNIL HNANKQIVISSDRPP KQLATLEDRLRTRFE WGLITDVQPPPELETR IAILRKKKAQMERLAV 353  
 T. th. SVDLILLVDDVQFIAG KERTQEEFFHTFNAL YEAKHQIILSSDRPP KDILITLRLRSRFE WGLITDNPAPDLETR IAILKMNAS-SGPEE 285  
 E. coli SVDALLIDDDIQFFAN KERSQEEFFHTFNAL LEGNQIILTSDRYP KEINGVEDRLKSRFG WGLTVAIEPPELETR VAILMKKADENDIRL 317  
 T. mar. KVDILLIDDDVQFLIG KTGVTQTELFHTFNEL HDSEKQIVICSOREP QKLSEFQDRLVSRFQ MGLVAKLEPPDEETR KSIARKMLEIEHGE 283  
 H. pyl. HCDFFLLDDAQFLQG KPKLEEEFFHTFNEL HANSKQIVLISDRSP KNLAGLEDRLKSRFE WGITAKVMPDLETK LSIVKQKQCNQITL 293

P. mar. PRDLIQFIAGRFTSN IRELEGALTRAIATA IRELEGALTRAIATA SITGLPMTVDSIAPM LD----PNGQGVET PKQVLDKVAEVFKVT PDEMRSASRRR-PVS 392  
 Syn. sp. PKEVIEYIASHYTSN IRELEGALIRAIAYT SLSNVAMTVENIAPV LN----PFVEKVAAA PETIITIVAQHYQLK VEELLSNSRRR-EVS 377  
 B. sut. PNEVMLYIANQIDSN IRELEGALIRVAYS SLINKDINADLAAEA LKDI--PSSKPKVIT IKEIQRVVGQQFNIK LEDFKAKKRTK-SVA 384  
 M. tub. PDDVLELIAASSIERN IRELEGALIRVTATA SLNKTPIDKALAEIV LRDLI-ADANTMQIS AATMAATAEYFDIT VEELRGPGKTR-ALA 441  
 T. th. PEDALEYIARQVTSN IREWEALMRASPPA SLNGVELTRAVAACA LRHLR-P--RELEAD PLEIRKKAAGPVRPE TPGGAHGERRKKEV 372  
 E. coli PGEVAFFIAKRLSN VRELEGALNRVIANA NFGTGRAITIDFVREA LRDL--A-LOEKLVT IDNIQKTVAEYKIK VADLLSKRRSR-SVA 404  
 T. mar. PEEVLNFVAENVDDN LRRLRGAIKILVYK ETTIGKEVDLKEAILL LKDFIKPNRVKAMD P IDELTETVAKVTGVP REEILSNSRNV-KAL 372  
 H. pyl. PEEVMEYLAQHISDN IROMEGAIKISVNA NLMNASIDLNLAKTV LEDL--QKDHAE GSS LENILLAVAQSLNLK SSEIKVSSRQK-NVA 380

P. mar. QARQVGYLMRQGTN LSLPRIGDTFGKDH TTVMYAIEQVEKKLS S-----DPQIA SQVQKIRDLLQIDSR RKR----- 461  
 Syn. sp. LARQVGYLMRQHTD LSLPRIGEAFGGKDH TTVMYSCDKITQLQQ K-----DWETS QTLTSLSHRINIAGQ APES----- 447  
 B. sut. FPRQIAMYLSREMTD SSLPKIGEFGGRDH TTVIHAHEKISKLLA D-----DEQLQ QHVKEIKEQLK----- 446  
 M. tub. QSRQIAMYLCRELTD LSLPKIGQAFG-RDH TTVMYAQRKILSEMA E-----RREVF DHVKELTTRIRORSK R----- 507  
 T. th. LPRQIAMYLVRELTP ASLPEIGQLFGGRDH TTVRYAIQKVQELAG KP-----DREVQ GLLRTLREACTDPVD NLWITCG 446  
 E. coli RPRQAMALAKELTN HSLPEIGDAFGGRDH TTVLHACRKIEQLRE E-----SHDIK EDFSNLIRTLSS----- 467  
 T. mar. TARRIGMYVAKNYLK SSLRTIAEFN-RSH PVVVDVSKVKDSSL KG-----NKQLK ALIDEVICEISRRAL SG----- 440  
 H. pyl. LARKLVVYFARLYTP NPTLSLAQFLDLKDH SSISKMYSGVKKMLE EEKSPFVLSLREEIK NRLNELNDKKTAFNS SE----- 457

FIG. 19B

GTGTCGCACGAGGCCGTCTGGCAACACGTTCTGGAGCA<sup>-</sup>  
 TCCGCCGCAGCATCACCGAGGTGGAGTTCCACACCTGGTT  
 TGAAAGGATCCGCCCTTGGGGATCCGGGACGGGGTGCTG 120  
 GAGCTCGCCGTGCCACCTCCTTTGCCCTGGACTGGATCC  
 GGCGCCACTACGCCGGCCTCATCCAGGAGGGCCCTCGGCT  
 CCTCGGGGCCCAGGCGCCCCGGTTTGAGCTCCGGGTGGTG 240  
 CCGGGGTCGTAGTCCAGGAGGACATCTTCCAGCCCCCGC  
 CGAGCCCCCGGCCAAGCTCAACCCGAAGATACCTTTAA  
 AACTTCGTGGTGGGGCCCAACAATCCATGGCCCCACGGC 360  
 GGCGCCGTGGCCGTGGCCGAGTCCCCCGGCCGGGCCTACA  
 ACCCCCTCTTCATCTACGGGGGCGGTGGCCTGGGAAAGAC  
 CTACCTGATGCACGCCGTGGGCCCACTCCGTGCGAAGCGC 480  
 TTCCCCCACATGAGATTAGAGTACGTTTCCACGGAAACTT  
 TCACCAACGAGCTCATCAACCGGCCATCCGCGAGGGACCG  
 - GATGACGGAGTTCCGGGAGCGGTACCGCTCCGTGGACCTC 600  
 CTGCTGGTGGACGACGTCCAGTTCATCGCCGGAAAGGAGC  
 GCACCCAGGAGGAGTTTTTCACACCTTCAACGCCCTTTA  
 CGAGGCCCAACAAGCAGATCATCCTCTCCTCCGACCGGCCG 720  
 CCAAGGACATCCTCACCCCTGGAGGCGCGCCTGCGGAGCC  
 GCTTTGAGTGGGGCCTGATCACCGACAATCCAGCCCCCGA  
 CCTGGAAACCCGGATCGCCATCCTGAAGATGAACGCCAGC 840  
 AGCGGGCCTGAGGATCCCGAGGACGCCCTGGAGTACATCG  
 CCCGGCAGGTCACCTCCAACATCCGGGAGTGGGAAGGGGC  
 CCTCATGCGGGCATCGCCTTTCGCCTCCCTCAACGGCGTT 960  
 GAGCTGACCCGCGCCGTGGCGGCCAAGGCTCTCCGACATC  
 TTCGCCCCAGGGAGCTGGAGGCGGACCCCTTGGAGATCAT  
 CCGCAAAGCGGCGGGACCAGTTCGGCCTGAAACCCCGGGA 1080  
 GGAGCTCACGGGGAGCGCCGCAAGAAGGAGGTGGTCCTCC  
 CCCGGCAGCTCGCCATGTACCTGGTGCGGGAGCTCACCCC  
 GGCTCCCTGCCCGAGATCGACCAGCTCAACGACGACCGG 1200  
 GACCACACCACGGTCCTCTACGCCATCCAGAAGGTCCAGG  
 AGCTCGCGGAAAGCGACCGGGAGGTGCAGGGCCTCCTCCG  
 CACCCTCCGGGAGGCGTGACATGA

FIG.20A



VSHEAVWQHVLHIRRSITEVEFHTWFERIRPLGIRDGVL  
ELAVPTSFALDWIRRHYAGLIQEGPRLPGAQAPRFELRVV  
PGVVQEDIFQPPSPPAQAQPEDTFKTSWWGPTTPWPHG 120  
GAVAVAESPGRAYNPLFIYGGRGLGKTYLMHAVGPLRAKR  
FPHMRLEYVSTETFTNELINRPSARDRMTEFRERYRSVDL  
LLVDDVQFIAGKERTQEEFFHTFNALYEAHKQIILSSDRP 240  
PKDILTLEARLRSRFEWGLITDNPAPDLETRIAILKMNAS  
SGPEDPEDALEYIARQVTSNIREWEGALMRASPFASLNGV  
ELTRA VAAKALRHLRPRELEADPLEIIRKAAGPVRPETPG 360  
GAHGERRKKEVVLPRQLAMYL VRELTPASLPEIDQLNDDR  
DHTTVLYA IQKVQELAESDREVQGLLRTLREACT

FIG.20B

ATGAACATAACGGTTCCCAAAAACTCCTCTCGGACCAGC 40  
 TTTCCCTCCTGGAGCGCATCGTCCCCTCTAGAAGCGCCAA  
 CCCCTCTACACCTACCTGGGGCTTTACGCCGAGGAAGGG 120  
 GCCTTGATCCTCTTCGGGACCAACGGGGAGGTGGACCTCG  
 AGGTCCGCCTCCCCGCCGAGGCCCAAGCCTTCCCCGGGT 200  
 GCTCGTCCCCGCCAGCCCTTCTTCCAGCTGGTGCGGAGC  
 CTTCTGTTGGGACCTCGTGGCCCTCGGCCTCGCCTCGGAGC 280  
 CGGGCCAGGGGGGGCAGCTGGAGCTCTCCTCCGGGCGTTT  
 CCGCACCCGGCTCAGCCTGGCCCTGCCGAGGGCTACCCC 360  
 GAGCTTCTGGTGCCCGAGGGGGAGGACAAGGGGGCCTTCC  
 CCCTCCGGACGCGGATGCCCTCCGGGGAGCTCGTCAAGGC 440  
 CTTGACCCACGTGCGCTACGCCGCGAGCAACGAGGAGTAC  
 CGGGCCATCTTCCGCGGGGTGCAGCTGGAGTTCTCCCCC 520  
 AGGGCTTCCGGGCGGTGGCCTCCGACGGGTACCGCCTCGE  
 CCTCTACGACCTGCCCCTGCCCCAAGGGTTCCAGGCCAAG 600  
 GCCGTGGTCCCCGCCCGAGCGTGACGAGATGGTGCGGG  
 TCCTGAAGGGGGCGGACGGGGCCGAGGCCGTCTCGCCCT 680  
 GGGCGAGGGGGTGTTGGCCCTGGCCCTCGAGGGCGGAAGC  
 GGGGTCCGGATGGCCCTCCGCCTCATGGAAGGGGAGTTCC 760  
 CCGACTACCAGAGGGTCATCCCCCAGGAGTTCGCCCTCAA  
 GGTCCAGGTGGAGGGGGAGGCCCTCAGGGAGGCGGTGCGC 840  
 CGGGTGAGCGTCCTCTCCGACCGGCAGAACCACCGGGTGG  
 ACCTCCTTTTGGAGGAAGGCCGGATCCTCCTCTCCGCCGA 920  
 GGGGGACTACGGCAAGGGGCAGGAGGAGGTGCCCGCCCAG  
 GTGGAGGGGCCGGACATGGCCGTGGCCTACAACGCCCGCT 1000  
 ACCTCCTCGAGGCCCTCGCCCCCGTGGGGGACCGGGCCCA  
 CCTGGGCATCTCCGGGCCACGAGCCCCGAGCCTCATCTGG 1080  
 GGGGACGGGGAGGGGTACCGGGCGGTGGTGGTGCCCTCA  
 GGGTCTAG 1128

FIG.21A

MNITVPKKLLSDQLSLLERIVPSRSANPLYTYLGLYAEAG 40  
ALILFGTNGEVDLEVRPAEAQSLPRVLVPAQPFQLVRS  
LPGDLVALGLASEPGGGQLELSSGRFRTRLAPAEAGYP 120  
- ELLVPEGEDKGAFPLRTRMPSELVKALTHVRYAASNEEY  
RAIFRGVQLEFSPQGFRAVASDGYRLALYDLPLPQGFQAK 200  
AVVPARSVDEMVRVLKGADGAEAVLALGEGVLALALEGGS  
GVRMALRLMEGEFPDYQRVIPQEFALKVQVEGEALREAVR 280  
RVSVLSDRQNHVRVDLLLEEGRILLSAEGDYGKGQEEVPAQ  
VEGPDMAVAYNARYLLEALAPVGDRHLGISGPTSPSLIW 360  
GDGEGYRAVVVPLRVZ

FIG.21B

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

MNITVPKLLSDQLSLLERTVPSRSANPLYTYLGLYAEAGALILFGTNGEVDLEVRLP  
AE MKFTVEREHLKPLQOVSGPLGGRPTLPILGNLLQVADGTLSTGTDL  
EMEMVARVALV MKFTIEREQLKPLQOVSGPLGGRPTLPILGNLLKVTENTLSL  
GTDLMEMMARVSL MQFSISRENILKPLQOVCGVLSNRPNIPVANNVLLQIEDYRLTITGTDL  
LEVELSSQYQLS MHFTIQREALKPLQVAGVVERRQTLPVLSNVLLVVCQQLSLGTDL  
LEVELVGRVQLE MKFTIQNDILATKNLKKITRVLVKNISFPIL  
ENILIQVEDGTLSTTTNNLEIELISKIEII

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

AQSLP-RVLVPAQFFQVLVRSPLGDLVALGLASEPGQGGQLELSSGRFRTRL  
SLAPAEGY QPHEPGATTVPARKFFDICRGLP-EGAEIAVQLE---GERMLVRSGRS  
RFSLSLTPAADF QSHEIGATTVPARKFFDIWRGLP-EGAEISVELD---GDRLLVRSGRS  
RFSLSLTPASDF SSSENGTFITPAKKFLDICRTLS-DDSEITVTFE---QDRALVQSGRS  
RFTLATQPAEEY EPAEPGEITVPARKLMDICKSLP-NDALIDIKVD---EQKLLVKAGRS  
RFTLSTLPAADF TKYIPGKTTISGRKIILNICRTLS-EKSKIKMQLK---NKKMYISSEN  
SNYILSTLSADTF

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

PELLVPEGEDKGAFLPTRMPSGELVKALTHVRVYAAASNEEYRAIFRGVQLEFS  
PQGFRAV PNLDD--WQSEVEFTLPQAT---MKRLIEATQFSMAHQDVRYYLNGML  
FETEGEELRTV PNLDD--WQSEVEFTLPQAT---LKRLIESTQFSMAHQDVRYYLNGML  
FETENTELRTV PNLTD--WQSEVDFELPONT---LRRLIEATQFSMANQDARYFLNGMK  
FETEGNLLRTV PTVEE--GPGSLTCNLEQSK---LRRLIERTSFAMAQQDVRYYLNGML  
LEVSRNTLRAV PNHQN--FDYISKFDISSNI---LKEMIEKTEFSMGKQDVRYYLNGML  
LEKKDKFLRSV

T.th.beta  
E.coli.bet  
P.mirab.be  
H.infl.bet  
P.put.beta  
B.cap.beta

ASDGYRLALYDLPLPQGFQA--KAVVPARSVDENVRLKGADGAEAVLAGEGV  
LALALE ATDGHRLAVCSMPIGQSLPS-HSVIVPRKGVIELMRMLDG-GDNPLRVQIGS  
NNIRAHVG ATDGHRLAVCAMDIGQSLPG-HSVIVPRKGVIELMRLLDGSGESLLOLQIGS  
NNLRAHVG ATDGHRLAVCTISLEQELQN-HSVILPRKGVLELVRLETT-NDEPARLQIGT  
NNLRVHLK STDGHRRLALCSMSAPIEQEDRHQVIVPRKGILELARLLTD-PEGMWSTIVL  
GQHHRATTTG ATDGYRLAISYTLKKDINF-FSIIIPNKAVMELLKLLNT-QPQLNILIGS  
NSIRIYTK

FIG.22A

T. th. beta	GGSGVRMALRMEGEFPDYQRVIPQEFALKVQVEGEALREAVRRVSULSDRQNHVRVDLLL
E. coli. bet	---DFIFTSKLVDRFPDYRRVLPKNPDKHLKAGCDLLKQAFARAAILSNEKFRGVRLVY
P. mirab. be	---DFIFTSKLVDRFPDYRRVLPKNPTKTVIAGCDILKQAFSRAAILSNEKFRGVRLNL
H. infl. bet	---NTVFTSKLIDGRFPDYRRVLPKNATKIVEGNWEMLKQAFARASILSNERARSVRLSL
P. put. beta	---EFTFTSKLVDRFPDYRRVLPKGGDKLVVGDQRALREAFSRTAILSNEKYRGIRLQL
B. cap. beta	---NLIFTTQLIEGEYPDYKSVLFKEKNPIITNSILLKKSLLRVAILAHEKFCGIEIKI

T. th. beta	EEGRILLSAEGDYK-GQEEVPAQVEGPDMAVAYNARYLLEALAPVG-DRAHLGISGPTS
E. coli. bet	SENQLKITANNPEQEEAEIILDVITYSGAEMEIGFNVSYLLDVLNALKCENVRMLTDSVS
P. mirab. be	TNGQLKITANNPEQEEAEIIVDQYQGEEMEIGFNVSYLLDVLNLTLCCEVKLLLTDAVS
H. infl. bet	KENQLKITASNTEHEEAEIIVDNNNGEELEVGFNVTYLLDVLNALKCNQVRMCLTDAFS
P. put. beta	AAGQLKIQANNPEQEEAEIISVDYEGSSLEIGFNVSYLLDVLGVMTEQVRLILSDSNS
B. cap. beta	ENGKFKVLSDNQEEETAEDLFEIDYFGEKIEISINVTYLLDVLNNIKSENIALFLNKSKS

T. th. beta	PSLIWGDG-EGYRAVVVPLRVZ	(ID#108)
E. coli. bet	SVQIEDAASQSAAYVVMFMRLLZ	(ID#109)
P. mirab. be	SVQVENVASAAAYVVMFMRLL-	(ID#110)
H. infl. bet	SCLJENCEDSSCEYVIMPMRL-	(ID#111)
P. put. beta	SALLQEAQNDDSSYVVMFMRLL-	(ID#112)
B. cap. beta	SIQIEAENNSSNAYVVMFLKR-	(ID#113)

FIG.22B

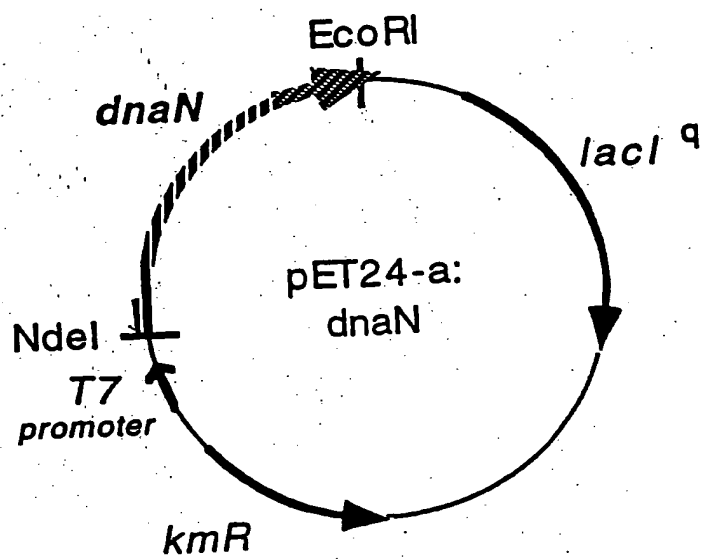
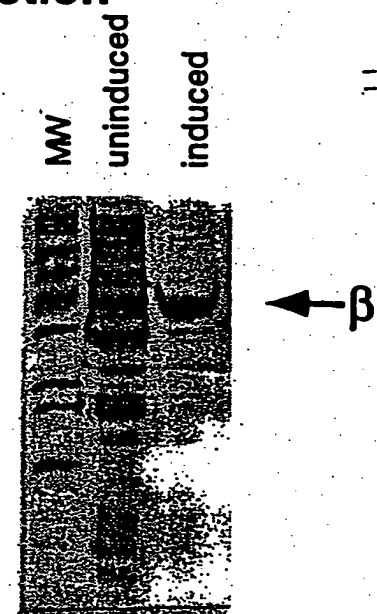


FIG.23

**FIG.24A Induction**



↓  
**Lysis**  
↓  
**Heat Step**  
↓

**FIG.24B MonoQ Column**

Fraction: 5 7 9 11 13 15 17 19 21 23 25

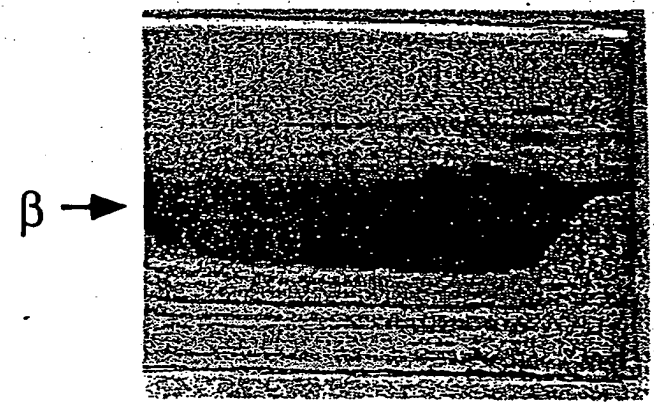


FIG.25A

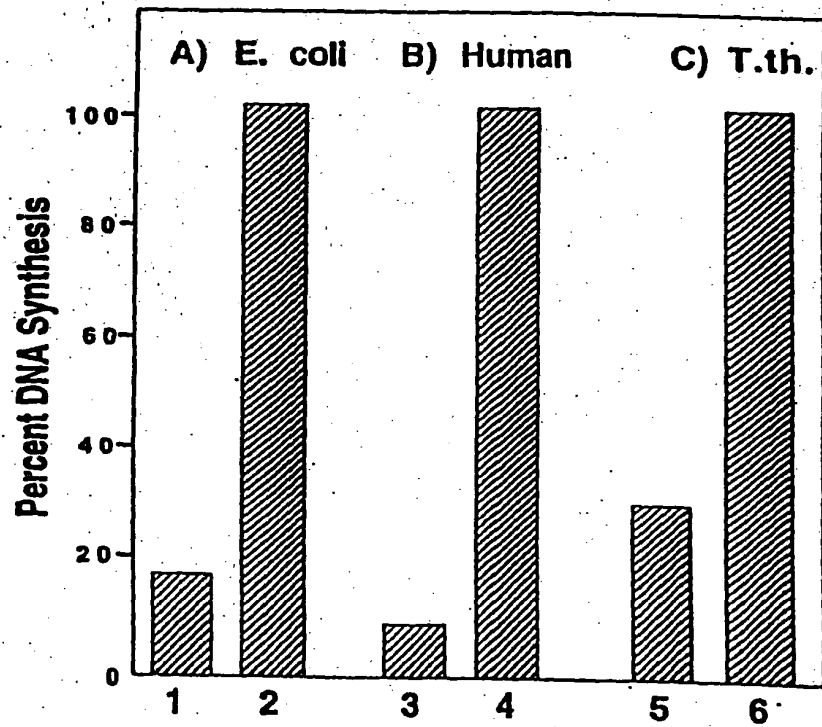
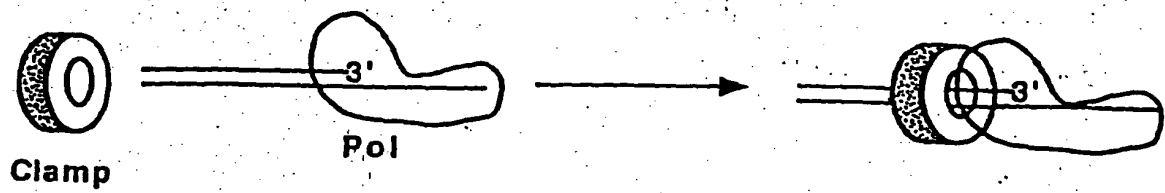


FIG.25B



FIG.26A

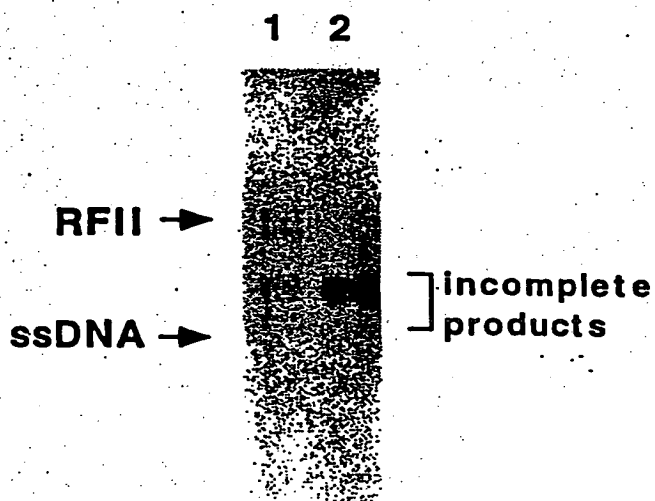
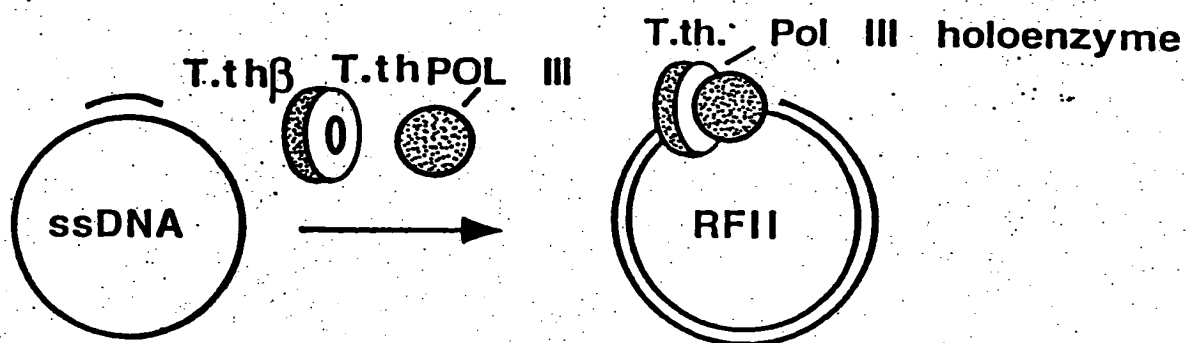


FIG.26B

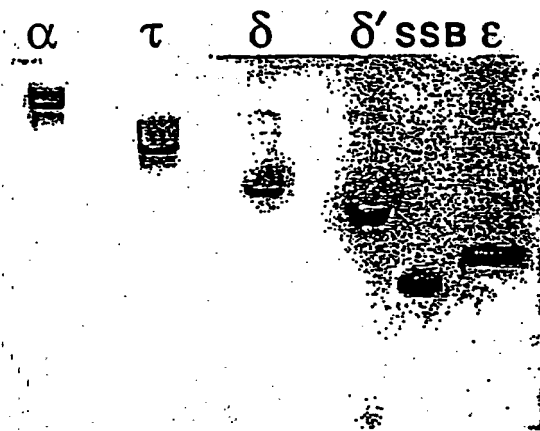


FIG. 27

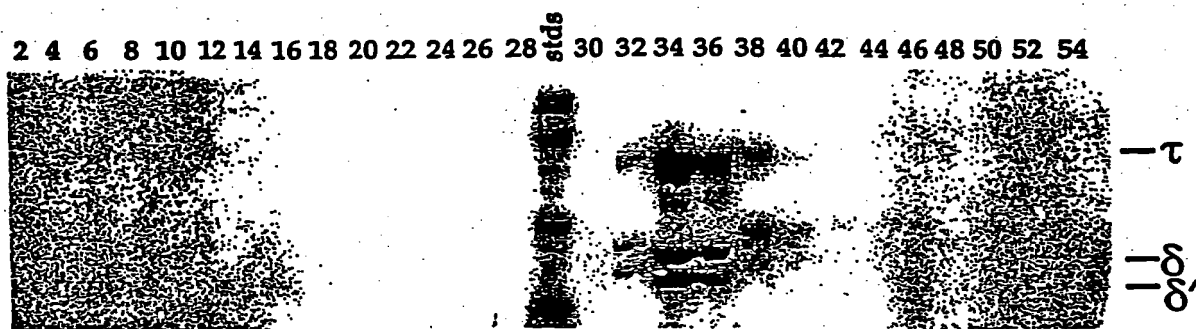


FIG. 28

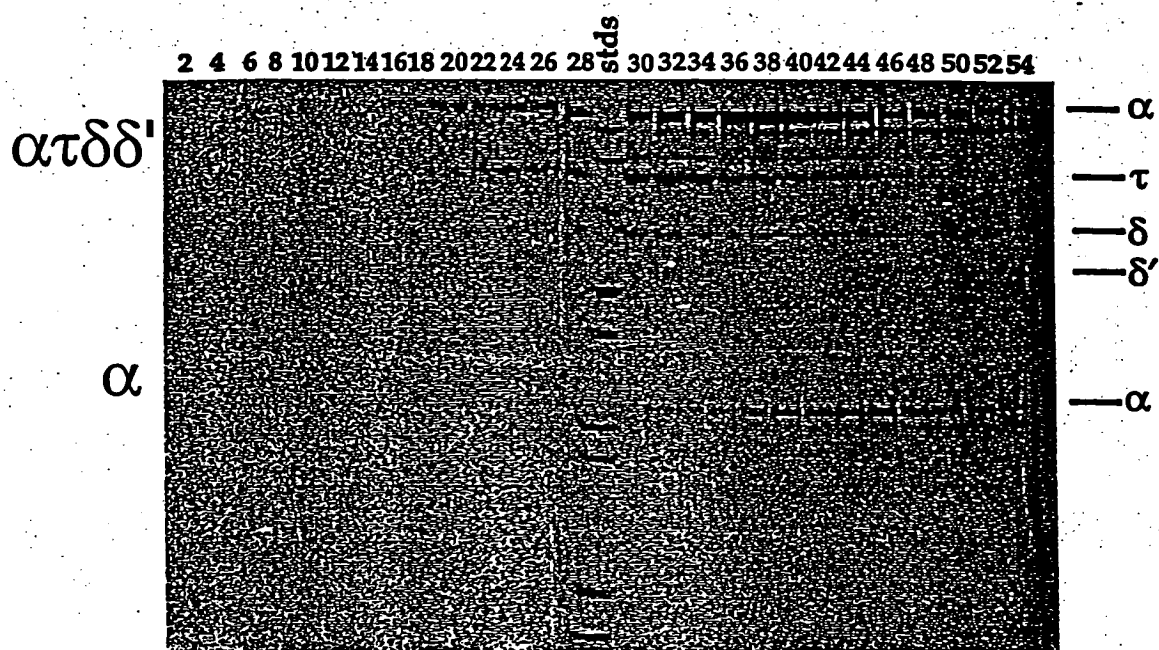


FIG. 29

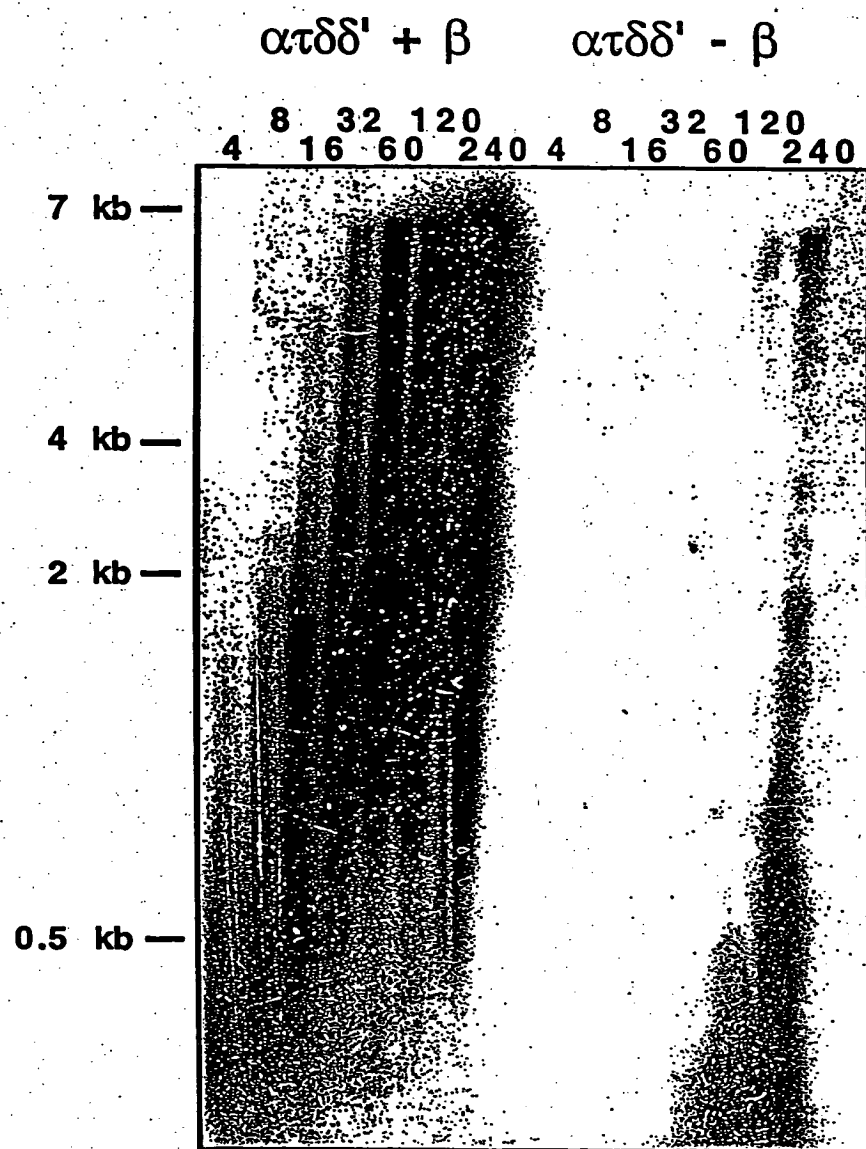
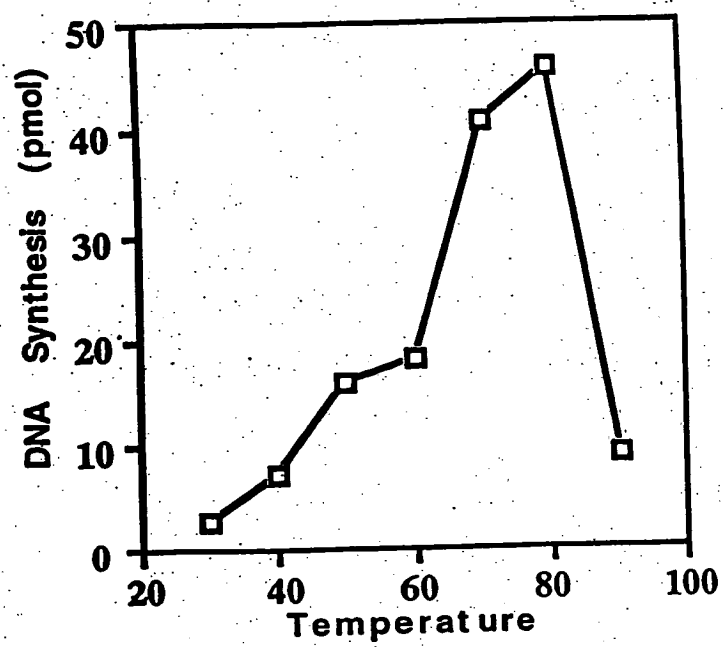
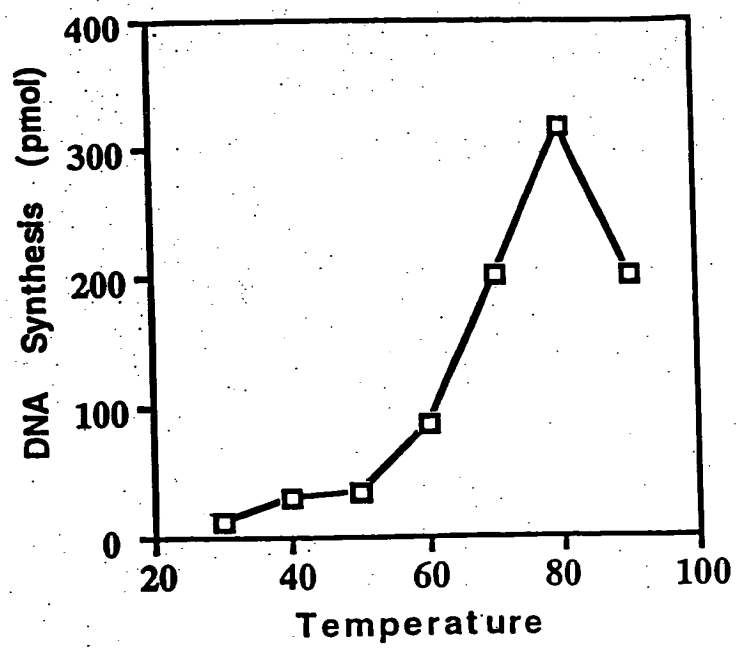


FIG. 30



**FIG. 31**



**FIG. 32**

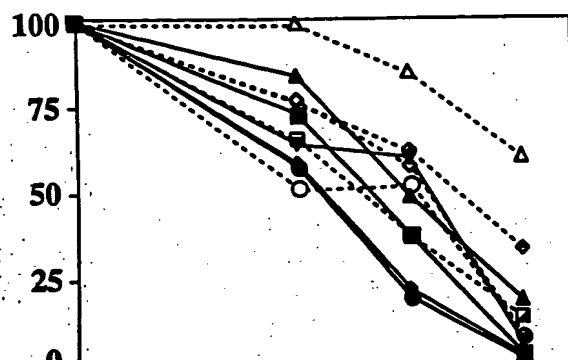
$\alpha$ 

FIG. 33A

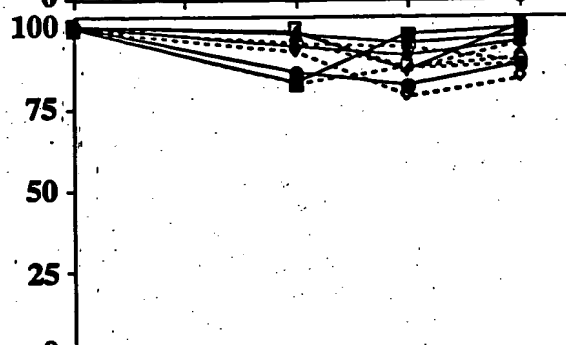
 $\beta$ 

FIG. 33B

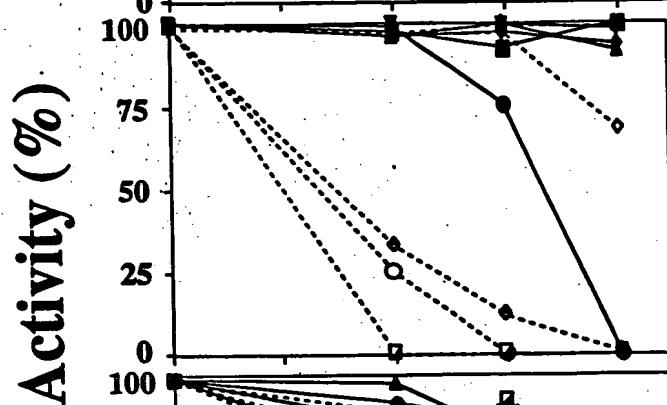
 $\tau\delta\delta'$ 

FIG. 33C

SSB

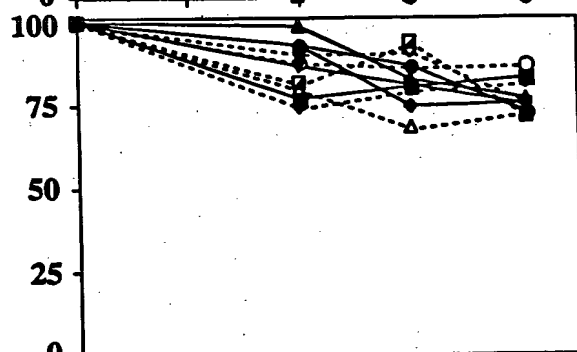


FIG. 33D

Pol III\*

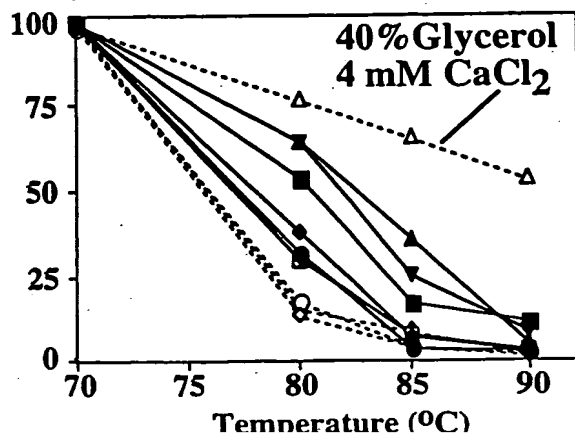


FIG. 33E

ATGAGTAAGGATTTCTGTCACCTTCACCTGCACACCCAGTTCTCACTCCT	
GGACGGGGCTATAAAGATAGACGAGCTCGTGAAAAAGGCAAAGGAGTATG	100
GATACAAAGCTGTCGGAATGTGAGACCACGGAAACCTCTTCGGTTTCGTAT	
AAATTCTACAAAGCCCTGAAGGCGGAAGGAATTAAGCCCATATCGGCAT	200
GGAAGCCTACTTTACCACGGGTTTCGAGGTTTGACAGAAAGACTAAAACGA	
GCGAGGACAACATAACCGACAAGTACAACCACCACCTCATACTTATAGCA	300
AAGGACGAAAAGGTCTAAAGAACTTAATGAAGCTCTCAACCCTCGCCTAC	
AAAGAAGGTTTTTACTACAAACCCAGAATTGATTACGAACTCCTTGAAAA	400
GTACGGGGAGGGCCTAATAGCCCTTACCGCATGCCTGAAAGGTGTTCCCA	
CCTACTACGCTTCTATAAACGAAGTGAAAAAGGCGGAGGAATGGGTAAAG	500
AAGTTCAAGGATATATTTCGGAGATGACCTTTATTTAGAACTTCAAGCGAA	
CAACATTCCAGAACAGGAAGTGGCAAACAGGAACTTAATAGAGATAGCCA	600
AAAAGTACGATGTGAAACTCATAGCGACGCAGGACGCCCACTACCTCAAT	
CCCGAAGACAGGTACGCCCACACGGTTCTTATGGCACTTCAAATGAAAAA	700
GACCATTACGAACTGAGTTCGGGAACTTCAAGTGTTCAAACGAAGACC	
TTCACTTTGCTCCACCCGAGTACATGTGGA AAAAGTTTGAAGGTAAGTTC	800
GAAGGCTGGGAAAAGGCACCTCTGAACACTCTCGAGGTAATGGAAAAGAC	
AGCGGACAGCTTTGAGATATTTGAAAACCTCCACCTACCTCCTTCCCAAGT	900
ACGACGTTCCGCCCCGACAAAACCTTGAGGAATACCTCAGAGAACTCGCG	
TACAAAGGTTTAAGACAGAGGATAGAAAGGGGACAAGCTAAGGATACTAA	1000
AGAGTACTGGGAGAGGCTCGAGTACGAACTGGAAGTTATAAACAAAATGG	
GCTTTGCGGGATACTTCTTGATAGTTTCAGGACTTCATAAACTGGGCTAAG	1100
AAAAACGACATACCTGTTGGACCCGGAAGGGGAAGTGCTGGAGGTTCCCT	
CGTCGCATACGCCATCGGAATAACGGACGTTGACCCCTATAAAGCACGGAT	1200
TCCTTTTGTGAGAGGTTCTTAAACCCCGAAAGGGTTTCCATGCCGGATATA	
GACGTGGATTCTGTTCAGGACAACAGGGAAAAGGTCATAGAGTACGTAAG	1300
GAACAAGTACGGACACGACAACGTAGCTCAGATAATCACCTACAACGTAA	
TGAAGGCGAAGCAAACACTGAGAGACGTCGCAAGGGCCATGGGACTCCCC	1400
TACTCCACCGCGGACAAACTCGCAAAACTCATTCTCAGGGGGACGTTCA	
GGGAACGTGGCTCAGTCTGGAAGAGATGTACAAAACGCCTGTGGAGGAAC	1500
TCCTTCAGAAGTACGGAGAACACAGAACGGACATAGAGGACAACGTAAAG	
AAGTTCAGACAGATATGCGAAGAAAGTCCGGAGATAAAACAGCTCGTTGA	1600
GACGGCCCTGAAGCTTGAAGGTCTCACGAGACACACCTCCCTCCACGCCG	
CGGGAGTGGTTATAGCACCAAGCCCTTGAGCGAGCTCGTTCCCCTCTAC	1700
TACGATAAAGAGGGCGAAGTCGCAACCCAGTACGACATGGTTTCAGCTCGA	
AGAACTCGGTCTCCTGAAGATGGACTTCTCGGACTCAAACCCCTCACAG	1800
AACTGAAACTCATGAAAGAACTCATAAAGGAAAGACACGGAGTGGATATA	
AACTTCCTTGAACCTTCCCCTTGACGACCCGAAAGTTTACAACTCCTTCA	1900
GGAAGGAAAAACCACGGGAGTGTTCCAGCTCGAAAGCAGGGGAATGAAAG	
AACTCCTGAAGAACTAAAGCCCCGACAGCTTTGACGACATCGTTGCGGTC	2000
CTCGCACTCTACAGACCCGGACCTCTAAAGAGCGGACTCGTTGACACATA	
CATTAAGAGAAAGCACGGAAAAGAACCCGTTGAGTACCCCTTCCCAGGAGC	2100
TTGAACCCGTCCTTAAGGAAACCTACGGAGTAATCGTTTATCAGGAACAG	
GTGATGAAGATGTCTCAGATACTTTCCGGCTTTACTCCCGGAGAGGCGGA	2200
TACCCTCAGAAAGGCGATAGGTAAAGAAAGCGGATTTAATGGCTCAGA	
TGAAAGACAAGTTCATACAGGGAGCGGTGGAAAGGGGATACCCTGAAGAA	2300
AAGATAAGGAAGCTCTGGGAAGACATAGAGAAGTTTCGCTTCTACTCCTT	
CAACAAGTCTCACTCGGTAGCTTACGGGTACATCTCTACTGGACCGCCT	2400

FIG. 34A

ACGTTAAAGCCCACTATCCCGCGGAGTTCTTCGCGGTAAAACCTCACAACT	
GAAAAGAACGACAACAAGTTCCTCAACCTCATAAAAGACGCTAAACTCTT	2500
CGGATTTGAGATACTTCCCCCGACATAAACAAGAGTGATGTAGGATTTA	
CGATAGAAGGTGAAAACAGGATAAGGTTTCGGGCTTGCGAGGATAAAGGGA	2600
GTGGGAGAGGAAACTGCTAAGATAATCGTTGAAGCTAGAAAGAAGTATAA	
GCAGTTCAAAGGGCTTGCGGACTTCATAAACAAAACCAAGAACAGGAAGA	2700
TAAACAAGAAAGTCGTGGAAGCACTCGTAAAGGCAGGGGCTTTTGACTTT	
ACTAAGAAAAAGAGGAAAGAACTACTCGCTAAAGTGGCAAACTCTGAAAA	2800
AGCATTAAATGGCTACACAAAACCTCCCTTTTCGGTGCACCGAAAGAAGAAG	
TGGAAGAACTCGACCCCTTAAAGCTTGAAAAGGAAGTTCTCGGTTTTTAC	2900
ATTTCAAGGCACCCCTTGACAACCTACGAAAAGCTCCTCAAGAACCGCTA	
CACACCCATTGAAGATTTAGAAGAGTGGGACAAGGAAAGCGAAGCGGTGC	3000
TTACAGGAGTTATCACGGAACCTCAAAGTAAAAAAGACGAAAAACGGAGAT	
TACATGGCGGTCTTCAACCTCGTTGACAAGACGGGACTAATAGAGTGTGT	3100
CGTCTTCCCGGGAGTTTACGAAGAGGCAAAGGAACTGATAGAAGAGGACA	
GAGTAGTGGTAGTCAAAGGTTTTCTGGACGAGGACCTTGAAACGGAAAAT	3200
GTCAAGTTCGTGGTGAAAGAGGTTTTCTCCCTGAGGAGTTCGCAAAGGA	
GATGAGGAATACCTTTATATATTCTTAAAAAGAGAGCAAGCCCTAAACG	3300
CGTTGCCGAAAACTAAAGGGAATTATTGAAAACAACAGGACGGAGGAC	
GGATACAACTTGTTCTCACGGTTGATCTGGGAGACTACTTCGTTGATTT	3400
AGCACTCCCACAAGATATGAACTAAAGGCTGACAGAAAGGTTGTAGAGG	
AGATAGAAAACTGGGAGTGAAGGTCATAATTTAGTAAATAACCCTTACT	3500
TCCGAGTAGTCCCC	

**FIG. 34B**



MSKDFVHLHLHTQFSLLDGAIKIDELVKKAKEYGYKAVGMSDHGNLFGSY	
KFYKALKAEGIKPIIGMEAYFTTGSRFDRKTKTSEDNITDKYNHHLILIA	100
KDDKGLKNLMKLSTLAYKEGFYKPRIDYELLEKYGEGLIALTACLKGV	
TYYASINEVKKAEWVKFKDIFGDDLYLELQANNIPEQEVANRNLIIEIA	200
KKYDVKLIATQDAHYLNPEDRYAHTVLMALQMKKTIHELSSGNFKCSNED	
LHFAPPEYMWKKFEGKFEGWEKALLNTLEVMEKTADSFEIFENSTYLLPK	300
YDVPPDKTLEEYLRELAYKGLRQRIERGQAKDTKEYWERLEYELEVINKM	
GFAGYFLIVQDFINWAKKNDIPVGPGRGSAGGSLVAYAIGITDVPDIKHG	400
FLFERFLNPERVSMPIIDVDFCQDNREKVIEWVRNKYGHNDVAQIITYNV	
MKAKQTLRDVARAMGLPYSTADKLAKLIPOGDVQGTWLSLEEMYKTPVEE	500
LLQKYGEHRDIEDNVKKFRQICEESPEIKQLVETALKLEGLTRHTSLHA	
AGVVIAPKPLSELVPLYDKEGEVATQYDMVQLEELGLLKMDFLGLKTLT	600
ELKLMKELIKERHGVDINFLELPLDDPKVYKLLQEGKTTGVFQLESRGMK	
ELLKKLKPDSFDDIVAVLALYRPGPLKSGLVDTYIKRKHGKEPVEYPFPE	700
LEPVLKETYGIVIVYQEQVMKMSQILSGFTPGEADTLRKAIGKKKADLMAQ	
MKDKFIQGAVERGYPEEKIRKLWEDIEKFASYSFNKSHSVAYGYISYWTA	800
YVKAHYPAEFFAVKLTTEKNDNKFLNLIKDAKLFGFEILPPDINKSDVGF	
TIEGENRIRFGLARIKGVGEETAKIIVEARKKYKQFKGLADFINKTKNRK	900
INKKVVEALVKAGAFDFTKKRRELAKVANSEKALMATQNSLFGAPKEE	
VEELDPLKLEKEVLGFYISGHPLDNYEKLKLNRYTPIEDLEWDKESEAV	1000
LTGVITELKVKKTKNGDYMVFNLVDKTGLIECVVFPGVYEEAKELIEED	
RVVVVKGFLDEDLETENVKFVVKEVFSPEEFKEMRNTLYIFLKREQALN	1100
GVAEKLKGIENNRTEDGYNLVLTVDLGDFVDLALPQDMKCLKADRKVVE	
EIEKLGVKVII	1161

FIG. 35

ATGAACTACGTTCCCTTCGCGAGAAAGTACAGACCGAAATTCTTCAGGGA	
AGTAATAGGACAGGAAGCTCCCGTAAGGATACTCAAAAACGCTATAAAAA	100
ACGACAGAGTGGCTCACGCCTACCTCTTTGCCGGACCGAGGGGGTGGG	
AAGACGACTATTGCAAGAATTCTCGCAAAGCTTTGAACTGTAAAAATCC	200
CTCCAAAGGTGAGCCCTGCGGTGAGTGCGAAAACCTGCAGGGAGATAGACA	
GGGGTGTGTTCCCTGACTTAATTGAAATGGATGCCGCCTCAAACAGGGGT	300
ATAGACGACGTAAGGGCATTAAAAGAAGCGGTCAATTACAAACCTATAAA	
AGGAAAGTACAAGGTTTACATAATAGACGAAGCTCACATGCTCACGAAAG	400
AAGCTTTCAACGCTCTCTTAAAAACCTCGAAGAGCCCCCTCCAGAACT	
GTTTTTCGTCTTTGTACCACGGAGTACGACAAAATTCTTCCCACGATACT	500
CTCAAGGTGTCAGAGGATAATCTTCTCAAAGGTAAAGAAAGGAAAAAGTAA	
TAGAGTATCTAAAAAGATATGTGAAAAGGAAGGGATTGAGTGCGAAGAG	600
GGAGCCCTTGAGGTTCTGGCTCATGCCTCTGAAGGGTGCATGAGGGATGC	
AGCCTCTCTCCTGGACCAGGCGAGCGTTTACGGGGAAGGCAGGGTAACAA	700
AAGAAGTAGTGGAGAACTTCTCGGAATTCTCAGTCAGGAAAGCGTTAGG	
AGTTTTCTGAAATTGCTTCTGAACTCAGAAGTGGACGAAGCTATAAAGTT	800
CCTCAGAGAACTCTCAGAAAAGGGCTACAACCTGACCAAGTTTTGGGAGA	
TGTTAGAAGAGGAAGTGAGAAACGCAATTTTAGTAAAGAGCCTGAAAAAT	900
CCCGAAAGCGTGGTTCAGAACTGGCAGGATTACGAAGACTTCAAAGACTA	
CCCTCTGGAAGCCCTCCTCTACGTTGAGAACCTGATAAACAGGGGTAAAG	1000
TTGAAGCGAGAACGAGAGAACCCTTAAGAGCCTTTGAACTCGCGGTAATA	
AAGAGCCTTATAGTCAAAGACATAATTCCCGTATCCCAGCTCGGAAGTGT	1100
GGTAAAGGAAACCAAAAAGGAAGAAAAGAAAGTTGAAGTAAAAGAAGAGC	
CAAAAGTAAAAGAAGAAAAACCAAAGGAGCAGGAAGAGGACAGGTTCCAG	1200
AAAGTTTAAACGCTGTGGACGGCAAATCCTTAAAAGAATACTTGAAGG	
GGCAAAAAGGGAAGAAAGAGACGGAAAAATCGTCCTAAAGATAGAAGCCT	1300
CTTATCTGAGAACCATGAAAAAGGAATTTGACTCACTAAAGGAGACTTTT	
CCTTTTTTTAGAGTTTGAACCCGTGGAGGATAAAAAAAACCTCAGAAGTC	1400
CAGCGGGACGAGGCTGTTTTAAAGGTAAAGGAGCTCTTCAATGCAAAAAT	
ACTCAAAGTACGAAGTAAAAGCTAAGGTCATAAAGGTGAGAATGCCCGTG	1500
GAAGAGATAGGGCTGTTTAACGCACTAATAGACGGCTTGCCACAGGTACGC	
ACTCACGAGGACGAAGGAAAAGGGAAAGGGAGAAGTTTTTCGTTTTAGCGA	1600
CTCCTTATAAAGTCAAGGAATTGATGGAAGCTATGGAGGGTATGAAAAAA	
CACATAAAGGATTTAGAAATCCTCGGAGAGACGGATGAGGATTTAACTTT	1700
TTAAAGTATGGGTGTATCTGAGCAAAGGTTTAAAGCTAAAAACAAACCTGA	
AACCCGCAGGGGACCAGCCGAAAGCCATAAAAAAACTCCTTGAAAACCTA	1800
AGGAAAGGCGTAAAAGAACAAACACTTCTCGGAGTCACGGGAAGCGGAAA	
GACTTTTACTCTAGCAAACGTAATAGCGAAGTACAACAAACCAACTCTTG	1900
TGGTAGTTTCAACAACAAATTTCTCGCGGCACAGCTATACAGGGAGTTTAA	
GAACTATTCCCTGAAAACGCTGTAGAGTACTTTGTCTCTTACTACGACTA	2000
TTACCAACCTGAAGCCTACATTCCCGAAAAAGATTATACATAGAAAAGG	
ACGCGAGTATAAACGAAAGCTGGAACGTTTCAGACACTCCGCCACGATAT	2100
CCGTTCTAGAAAGGAGGGACGTTATAGTAGTTGCTTCAGTTTCTTGCCATA	
TACGGACTCGGGAAACCTGAGCACTACGAAAACCTGAGGATAAACTCCA	2200
AAGGGGAATAAGACTGAACTTGAGTAAGCTCCTGAGGAAACTCGTTGAGC	
TAGGATATCAGAGAAATGACTTTGCCATAAAGAGGGCTACCTTCTCGGTT	2300
AGGGGAGACGTGGTTGAGATAGTCCCTTCTCACACGGAAGATTACCTCGT	
GAGGGTAGAGTTCTGGGACGACGAAGTTGAAAGAATAGTCCTCATGGACG	2400
CTCTGAAC	

FIG. 36

MNYVPFARKYRPKFFREVIGQEAPVRILKNAIKNDRVAHAYLFAGPRGVG	
KTTIARILAKALNCKNPSKGEPCGECENCREIDRGVFPDLIEMDAASNRG	100
IDDVRLKEAVNYKPIKGKYKVYIIDEAHMLTKEAFNALLKTLEPPPRRT	
VFVLCTTEYDKILPTILSRCQRIIFSQRKEKVIIEYLKKICEKEGIECEE	200
GALEVLAHASEGCMRDAASLLDQASVYGEGRVTKEVVENFLGILSQESVR	
SFLKLLLNSEVDEAIKFLRELSEKGYNLTKFWEMLEEEVRNAILVKSLKN	300
PESVVQNWQDYEDFKDYPLEALLYVENLINRGKVEARTREPLRAFELAVI	
KSLIVKDIIPVSQLGSSVKETKKEEKKEVKEEPKVKEEKPKKEQEEDRFQ	400
KVLNAVDGKILKRILEGAKREERDGGKIVLKIEASYLRTMKKEFDSLKETF	
PFLEFEPVEDKKKPKSSGTRLF	473

**FIG. 37**

ATGCGCGTTAAGGTGGACAGGGAGGAGCTTGAAGAGGTTCTTAAAAAAGC	
AAGAGAAAGCACGGAAAAAAGCCGCACTCCCGATACTCGCGAACTTCT	100
TACTCTCCGCAAAAGAGGAAAACTTAATCGTAAGGGCAACGGACTTGGA	
AACTACCTTGTAAGTCTCCGTAAAGGGGGAGGTTGAAGAGGAAGGAGAGGT	200
TTGCGTCCACTCTCAAAAACCTCTACGATATAGTCAAGAACTTAAATCCG	
CTTACGTTTACCTTCATACGGAAGGTGAAAAACCTCGTCATAACGGGAGGA	300
AAGAGTACGTACAAACTTCCGACAGCTCCCGCGGAGGACTTTCCCGAATT	
TCCAGAAATCGTAGAAGGAGGAGAAACACTTTCGGGAAACCTTCTCGTTA	400
ACGGAATAGAAAAGGTAGAGTACGCCATAGCGAAGGAAGAAGCGAACATA	
GCCCTTCAGGGAATGTATCTGAGAGGATACGAGGACAGAATTCACCTTGT	500
GTTTCGGAGGGTCACAGGCTTGCACTTTATGAACCTCTACGTAAACATTGA	
AAAGAGTGAAGACGAGTCTTTTGCTTACTTCTCCACTCCCGAGTGGAAC	600
TCGCCGTTAGCTCCTGGAAGGAGAATTCCCGGACTACATGAGTGTCATCC	
CTGAGGAGTTTTTCGGCGGAAGTCTTGTTTGAGACAGAGGAAGTCTTAAAG	700
GTTTTAAAGAGGTTGAAGGCTTTAAGCGAAGGAAAAGTTTTTCCCGTGAA	
GATTACCTTAAGCGAAAACCTTGCCATCTTTGAGTTCGCGGATCCGGAGT	800
TCCGAGAAGCGAGAGAGGAAATTGAAGTGAGTACACGGGAGAGCCCTTT	
GAGATAGGATTCAACGGAAATACCTTATGGAGGCGCTTGACGCCTACGAC	900
AGCGAAAGAGTGTGGTTCAAGTTCACAACCCCCGACACGGCCACTTTATT	
GGAGGCTGAAGATTACGAAAAGGAACCTTACAAGTGCATAATAATGCCGA	1000
TGAGGGTGTAGCCATGAAAAAGCTTTAATCTTTTATTGAGCTTGAGCC	
TTTTAATTCCTGCGTTTAGCGAAGCCAAACCCAAGTCTTC	1090

FIG. 38

MRVKVDREELVKKARESTEKKAALPILANFLLSAKEENLIVRATDLE	
NYLVVSVKGEVEEEGEVVCVHSQKLYDIVKNLNSAYVYLHTEGEKLVITGG	100
KSTYKLPTAPAEFDFPEFPEIVEGGETLSGNLLVNGIEKVEYAIKEEANI	
ALQGMYLRYEDRIHFVGS DGHRLALYEPLGEFSKELLIPRKS LKVLKKL	200
ITGIEDVNIKSEDESFA YFSTPEWKLAVRLLEGEFPDYMSVIP EEFSAE	
VLFEETEEVLKVLKRLKALSEGKVFPVKITLSENLAIFE FADPEFGEAREE	300
IEVEYTGEPFEIGFNGKYLMEALDAYDSERVWFKFTTPDTATLLEAEDYE	
KEPYKCIIMPMRV	363

FIG. 39

GTGGAAACCACAATATTCCAGTTCCAGAAAACCTTTTTCACAAAACCTCC	
GAAGGAGAGGGTCTTCGTCTTCATGGAGAAGAGCAGTATCTCATAAGAA	100
CCTTTTTGTCTAAGCTGAAGGAAAAGTACGGGGAGAATTACACGGTTCTG	
TGGGGGGATGAGATAAGCGAGGAGGAATTCTACACTGCCCTTCCGAGAC	200
CAGTATATTTCGGCGGTTCAAAGGAAAAAGCGGTGGTCATTTACAACCTTCG	
GGGATTTCCTGAAGAAGCTCGGAAGGAAGAAAAAGGAAAAAGAAAGGCTT	300
ATAAAAGTCCTCAGAAACGTAAAGAGTAACTACGTATTTATAGTGTACGA	
TGCGAAACTCCAGAAACAGGAACTTTCTTCGGAACCTCTGAAATCCGTAG	400
CGTCTTTCGGCGGTATAGTGGTAGCAAAACAGGCTGAGCAAGGAGAGGATA	
AAACAGCTCGTCCTTAAGAAGTTCAAAGAAAAAGGGATAAACGTAGAAAA	500
CGATGCCCTTGAATACCTTCTCCAGCTCACGGGTTACAACCTTGATGGAGC	
TCAAACCTTGAGGTTGAAAACTGATAGATTACGCAAGTGAAAAGAAAATT	600
TTAACTCTCGATGAGGTAAAGAGAGTAGCCTTCTCAGTCTCAGAAAACGT	
AAACGTATTTGAGTTCGTTGATTTACTCCTCTTAAAAGATTACGAAAAGG	700
CTCTTAAAGTTTTGGACTCCCTCATTTCTTCGGAATACACCCCTCCAG	
ATTATGAAAATCCTGTCCTCCTATGCTCTAAAACCTTACACCCTCAAGAG	800
GCTTGAAGAGAAGGGAGAGGACCTGAATAAGGCGATGGAAAGCGTGGGAA	
TAAAGAACAACCTTCTCAAGATGAAGTTCAAATCTTACTTAAAGGCAAAC	900
TCTAAAGAGGACTTGAAGAACCTAATCCTCTCCCTCCAGAGGATAGACGC	
TTTTTCTAAACTTTACTTTTCAAGACACAGTGCAGTTGCTGGGGATTCTT	1000
GACCTCAAGACTGGAGAGGGAAGTTGTGAAAAATACTTCTCATGGTGGAT	
AATCTTTTTTATGAAGTTTGCGGTTTGCGTTTTTCCCGGTTCT	1093

FIG. 40

VETTIFQFQKTFFTKPPKERVFLHGEEQYLIRTFLSKLKEKYGENYTVL	
WGDEISEEEFYTALSETSI FGGSKEKAVVIYNFGDFLKKLGRKKKEKERL	100
IKVLRNVKSNYVFIVYDAKLQKQELSSEPLKSVASFGGIVVANRLSKERI	
KQLVLKKFKEKGINVENDALEYLLQLTGYNLMELKLEVEKLIDYASEKKI	200
LTLDEVKRVAFSVSENVNVFEFVDLLLLKDYEKALKVLDLISFGIHPLQ	
IMKILSSYALKLYTLKRLEEKGEDLNKAMESVGIKNNFLKMKFKSYLKAN	300
SKEDLKNLILSLQRIDAFSKLYFQDTVQLLRDFLTSRLEREVVKNTSHGG	

FIG. 41

ATGGAAAAAGTTTTTTTGGAAAACTCCAGAAAACCTTGACATACCCGG	
AGGACTCCTTTTTTACGGCAAAGAAGGAAGCGGAAAGACGAAAACAGCTT	100
TTGAATTTGCAAAAGGTATTTTATGTAAGGAAAACGTACCTGGGGATGCG	
GAAGTTGTCCCTCCTGCAAACACGTAAACGAGCTGGAGGAAGCCTTCTTT	200
AAAGGAGAAATAGAAGACTTTAAAGTTTATAAGACAAGGACGGTAAAAAG	
CACTTCGTTTACCTTATGGGCGAACATCCCGACTTTGTGGTAATAATCCC	300
GAGCGGACATTACATAAAGATAGAACAGATAAGGGAAGTTAAGAACTTTG	
CCTATGTGAAGCCCGCACTAAGCAGGAGAAAAGTAATTATAATAGACGAC	400
GCCACGCGATGACCTCTCAGGCGGCAAACGCTCTTTTAAAGGTATTGGA	
AGAGCCACCTGCGGACACCACCTTTATCTTGACCACGAACAGGCGTTCTG	500
CAATCCTGCCGACTATCCTCTCCAGAACTTTTCAAGTGGAGTTCAAGGGC	
TTTTCAGTAAAAGAGGTATGGAATAGCGAAAGTAGACGAGGAAATAGC	600
GAACTCTCTGGAGGCAGTCTAAAAAGGGCTATCTTACTAAAGGAAAACA	
AAGATATCCTAAACAAAGTAAAGGAATTCTTGAAAACGAGCCGTAAAA	700
GTTTACAAGCTTGCAAGTGAATTGAAAAGTGGGAACCTGAAAAGCAAAA	
ACTCTTCCTTGAAATTATGGAAGAATTGGTATCTCAAAAATTGACCGAAG	800
AGAAAAAAGACAATTACACCTACCTTCTTGATACGATCAGACTCTTTAAA	
GACGGAATCGCAAGGGGTGTAAACGAACCTCTGTGGCTGTTTACGTTAGC	900
CGTTCAGGCGGATTAATAAACCGTTATTGATTCCGTAACATTTAAACCTT	
AATCTAAATTATGAGAGCCTTTGAAGGAGGTCTGGTATGGAAAATTTGAA	1000
GATTAGATATATAGATACGAGGAAGATAGGAACCGTGAGCGGTGTAAAAG	
T	1051

FIG. 42

MEKVFLEKLQKTLHIPGGLLFYGKEGSGKTKTAFEFAKGILCKENVPWGC	
GSCPSCKHVNELEEAFFKGEIEDFKVYKDKDGKKHVFVYLMGEHPDFVVI	100
PSGHYIKIEQIREVKNFAYVKPALSRKVI IIDDAHAMTSQAANALLKVL	
EEPPADTTFILTTNRRSAILPTILSRTFQVEFKGFSVKEVMEIAKVDEEI	200
AKLSGGSLLKRAILLKENKDILNKVKEFLENEPLKVYKLASEFEKWEPEKQ	
KLFLEIMEELVSQKLTEEKKNYTYLLDTIRLFKDGGLARGVNEPLWLFTL	300
AVQAD	

FIG. 43

ATGAACTTCCTGAAAAAGTTCTTTTACTGAGAAAAGCTCAAAAGTCTCC	
TTACTTCGAAGAGTTCTACGAAGAAATCGATTTGAACCAGAAGGTGAAAG	100
ATGCAAGGTTTGTAGTTTGTGACTGCGAAGCCACAGAACTCGACGTAAAG	
AAGGCAAAACCTCCTTTCAATAGGTGCGGTTGAGGTTAAAAACCTGGAAAT	200
AGACCTCTCTAAATCTTTTACGAGATACTCAAAAGTGACGAGATAAAGG	
CGGCGGAGATACATGGAATAACCAGGGAAGACGTTGAAAAGTACGGAAAG	300
GAACCAAAGGAAGTAATATACGACTTTCTGAAGTACATAAAGGGAAGCGT	
TCTCGTTGGCTACTACGTGAAGTTTGACGTCTCACTCGTTGAGAAGTACT	400
CCATAAGTACTTCCAGTATCCAATCATCAACTACAAGTTAGACCTGTTT	
AGTTTCGTGAAGAGAGAGTACCAGAGTGGCAGGAGTCTTGACGACCTTAT	500
GAAGGAACTCGGTGTAGAAATAAGGGCAAGGCACAACGCCCTTGAAGATG	
CCTACATAACCGCTCTTCTTTTCTTAAAGTACGTTTACCCGAACAGGGAG	600
TACAGACTAAAGGATCTCCCGATTTTCCTT	

**FIG. 44**

MNFLKKFLLLKKAQKSPYFEEFYEEIDLNQKVKDARFVVFDCATELDVK	
KAKLLSIGAVEVKNLEIDLKSFYEILKSDEIKAAEIHGITREDVEKYGK	100
EPKEVIYDFLKYIKGSVLVGYVVKFDVSLVEKYSIKYFQYPIINYKLDLF	
SFVKREYQSGRSLDDLKELGVEIRARHNALEDAYITALLFLKYVYPNRE	200
YRLKDLPIFL	

**FIG. 45**

ATGCTCAATAAGGTTTTTATAATAGGAAGACTTACGGGTGACCCCGTTAT  
 AACTTATCTACCGAGCGGAACGCCCCGTAGTAGAGTTTACTCTGGCTTACA 100  
 ACAGAAGGTATAAAAACCAGAACGGTGAATTTTCAGGAGGAAAGTCACTTC  
 TTTGACGTAAAGGCGTACGGAAAAATGGCTGAAGACTGGGCTACACGCTT 200  
 CTCGAAAGGATACCTCGTACTCGTAGAGGGAAGACTCTCCCAGGAAAAGT  
 GGGAGAAAGAAGGAAAGAAGTTCTCAAAGGTCAGGATAATAGCGGAAAAC 300  
 GTAAGATTAATAAACAGGCCGAAAGGTGCTGAACTTCAAGCAGAAGAAGA  
 GGAGGAAGTTCTCTCCATTGAGGAGGAAATTGAAAAACTCGGTAAAGAGG 400  
 AAGAGAAGCCTTTTACCGATGAAGAGGACGAAATACCTTTTTTAATTTTGA  
 GGAGGTTAAAGTATGGTAGTGAGAGCTCCTAAGAAGAAAGTTTGTATGTA 500  
 CTGTGAACAAAAGAGAGAGCCAGATT

**FIG. 46**

MLNKVFIIGRLTGDPVITYLPSGTPVVEFTLAYNRRYKNQNGEFQEESEHF  
 FDKAYGKMAEDWATRFSGYLLVVEGRLSQEKWEKEGKKFSKVRIIAEN 100  
 VRLINRPKGAELOAEIEEEVPPIEEEIEKLGKEEEKPFTDEEDEIPF

**FIG. 47**



ATGCAATTTGTGGATAAACTTCCCTGTGACGAATCCGCCGAGAGGGCGGT	
TCTTGGCAGTATGCTTGAAGACCCCGAAAACATACCTCTGGTACTTGAAT	100
ACCTTAAAGAAGAAGACTTCTGCATAGACGAGCACAAGCTACTTTTCAGG	
GTTCTTACAAACCTCTGGTCCGAGTACGGCAATAAGCTCGATTTTCGTATT	200
AATAAAGGATCACCTTGAAAAGAAAACTTACTCCAGAAAATACCTATAG	
ACTGGCTCGAAGAACTCTACGAGGAGGCGGTATCCCCTGACACGCTTGAG	300
GAAGTCTGCAAAATAGTAAAACAACGTTCCGCACAGAGGGCGATAATTCA	
ACTCGGTATAGAACTCATTACAAAGGAAAGGAAAACAAAGACTTTTCACA	400
CATTAATCGAGGAAGCCCAGAGCAGGATATTTTCCATAGCGGAAAGTGCT	
ACATCTACGCAGTTTACCATGTGAAAGACGTTGCGGAAGAAGTTATAGA	500
ACTCATTTATAAATTCAAAAGCTCTGACAGGCTAGTCACGGGACTCCCAA	
GCGGTTTCACGGAACTCGATCTAAAGACGACGGGATTCCACCCTGGAGAC	600
TTAATAATACTCGCCGCAAGACCCGGTATGGGGAAAACCGCCTTTATGCT	
CTCCATAATCTACAATCTCGCAAAAGACGAGGGAAAACCCCTCAGCTGTAT	700
TTTCCTTGGAAATGAGCAAGGAACAGCTCGTTATGAGACTCCTCTCTATG	
ATGTCGGAGGTCCCACTTTTCAAGATAAGGTCTGGAAGTATATCGAATGA	800
AGATTTAAAGAAGCTTGAAGCAAGCGCAATAGAACTCGCAAAGTACGACA	
TATACCTCGACGACACACCCGCTCTCACTACAACGGATTTAAGGATAAGG	900
GCAAGAAAGCTCAGAAAGGAAAAGGAAGTTGAGTTCGTGGCGGTGGACTA	
CTTGCAACTTCTGAGACCGCCAGTCCGAAAGAGTTCAAGACAGGAGGAAG	1000
TGGCAGAGGTTTCAAGAACTTAAAAGCCCTTGCAAAGGAAGTTTACATT	
CCCGTTATGGCACTTGCGCAGCTCTCCCGTGAGGTGGAAAAGAGGAGTGA	1100
TAAAAGACCCCAGCTTGCGGACCTCAGAGAATCCGGACAGATAGAACAGG	
ACGCAGACCTAATCCTTTTCTCCACAGACCCGAGTACTACAAGAAAAG	1200
CCAAATCCCGAAGAGCAGGGTATAGCGGAAGTGATAATAGCCAAGCAAAG	
GCAAGGACCCACGGACATTGTGAAGCTCGCATTTATTAAGGAGTACACTA	1300
AGTTTGCAAACCTAGAAGCCCTTCTGAACAACCTCCTGAAGAAGAGGAA	
CTTTCCGAAATTATTGAAACACAGGAGGATGAAGGATTCTGAAGATATTGA	1400
CTTCTGAAAATTAAGGTTTTATAATTTTATCTTGGCTATCCGGGGTAGCT	
CAATCGGCAGAGCGGGTGGCTG	1472

FIG. 48

MQFVDKLPCEDESAERAVLGSMLLEDPENIPLVLEYLKEEDFCIDEHKLLFR	
VLTNLWSEYGNKLDVFLIKDHLEKKNLLQKIPIDWLEELYEEAVSPDTLE	100
EVCKIVKQRSAQRAIIQLGITSTQFYHVKDVAEEVIELIYKFKSSDRLVT	
GLPSGFTDLKTTGFHPGDLIIAARPGMGKTAFMLSIIYNLAKDEGKP	200
SAVFSLEMSKEQLVMRLLSMMSEVPLFKIRSGSISNEDLKKLEASAIELA	
KYDIYLDLDDTPALTTTDLRIRARKLRKEKEVEFVAVDYLQLLRPPVRKSSR	300
QEEVAEVSRLKALAKELHIPVMALAQLSREVEKRSKRPQLADLRESGQ	
IEQDADLILFLHRPEYYKKKPNPEEQGIAEVIIAQROGPTDIVKLAFIK	400
EYTKFANLEALPEQPPEEEELSEIIETQEDEGFEDIDF	

FIG. 49

ATGTCCTCGGACATAGACGAACTTAGACGGGAAATAGATATAGTAGACGT	
CATTTCCGAATACTTAAACTTAGAGAAGGTAGGTTCCAATTACAGAACGA	100
ACTGTCCCTTTACCCTGACGATACCCCTCCTTTTACGTGTCTCCAAGT	
AAACAAATATTCAAGTGTTCGGTTGCGGGGTAGGGGGAGACGCGATAAA	200
GTTTCGTTTCCCTTTACGAGGACATCTCCTATTTTGAAGCCGCCCTTGAAC	
TCGCAAAACGCTACGGAAAGAAATTAGACCTTGAAAAGATATCAAAAGAC	300
GAAAAGGTATACGTGGCTCTTGACAGGGTGTGTGATTTCTACAGGGAAAG	
CCTTCTCAAAAACAGAGAGGCAAGTGAGTACGTAAAGAGTAGGGGAATAG	400
ACCCTAAAGTAGCGAGGAAGTTTGATCTTGGGTACGCACCTTCCAGTGAA	
GCACTCGTAAAAGTCTTAAAAGAGAACGATCTTTTAGAGGCTTACCTTGA	500
AACTAAAAACCTCCTTTCTCCTACGAAGGGTGTTTACAGGGATCTCTTTC	
TTCGGCGTGTCTGTGATCCCGATAAAGGATCCGAGGGGAAGAGTTATAGGT	600
TTCGGTGGAAGGAGGATAGTAGAGGACAAATCTCCAAGTACATAAACTC	
TCCAGACAGCAGGGTATTTAAAAGGGGGAGAACTTATTCGGTCTTTACG	700
AGGCAAAGGAGTATATAAAGGAAGAAGGATTTGCGATACTTGTGGAAGGG	
TACTTTGACCTTTTGAGACTTTTTTCCGAGGGAATAAGGAACGTTGTTGC	800
ACCCCTCGGTACAGCCCTGACCCAAAATCAGGCAAACCTCCTTTCCAAGT	
TCACAAAAAAGGTCTACATCCTTTACGACGGAGATGATGCGGGAAGAAAG	900
GCTATGAAAAGTGCCATTCCTTACTCCTCAGTGCAGGAGTGGAAGTTTA	
TCCCGTTTACCTCCCCGAAGGATACGATCCCGACGAGTTTATAAAGGAAT	1000
TCCGGAAAGAGGAATTAAGAAGACTGATAAACAGCTCAGGGGAGCTCTTT	
GAAACGCTCATAAAAACCGCAAGGGAAAACCTTAGAGGAGAAAACGCGTGA	1100
GTTTCAGGTATTATCTGGGCTTTATTTCCGATGGAGTAAGGCGCTTTGCTC	
TGGCTTTCGGAGTTTTCACACCAAGTACAAAGTTCTTATGGAAATTTTATTA	1200
ATGAAAATTGAAAAAATTCTCAAGAAAAAGAAATTAACTCTCCTTTAA	
GGAAAAATCTTCTGAAAGGACTGATAGAATTAAACCAAAAATAGACC	1300
TTGAAGTCCTGAACTTAAGTCCTGAGTTAAAGGAACTCGCAGTTAACGCC	
TTAAACGGAGAGGAGCATTACTTCCAAAAGAAGTTCTCGAGTACCAGGT	1400
GGATAACTTGAGAGAACTTTTTTAACAACATCCTTAGGGATTACAAAAAT	
CTGGGAAAAAGAGGAAGAAAAGAGGGTTGAAAAATGTAAATACTTAATTA	1500
ACTTTAATAAATTTTATAGAGTTAGGA	

FIG. 50

MSSDIDELRREIDIVDVI SEYLNLEKVGSNYRTNCPFHPDDTPSFYVSPS	
KQIFKCFGCGVGDAIKFVSLYEDISYFEAALELAKRYGKKLDLEKISKD	100
EKVYVALDRVCDFYRESLLKNREASEYVKSRGIDPKVARKFDLGYAPSSE	
ALVKVLKENDLLEAYLETKNLLSPTKGVYRDLFLRRVVIPIKDPRGRVIG	200
FGRRIVEDKSPKYINSPDSRVFKKGENLFLGLYEKEYIKEEGFAILVEG	
YFDLLRLFSEGIRNVVAPLGTALTQNQANLLSKFTKKVYILYDGGDAGRK	300
AMKSAIPLLLSAGVEVYPVYLPEGYDPDEFIKEFGKEELRRLINSSGELF	
ETLIKARENLEEKTRFRYYLGFISDGVRRFALASEFHTKYKVPMEILL	400
MKIEKNSQEKEIKLSFKEKIFLKGLIELKPKIDLEVLNLSPELKELAVNA	
LNKEEHLPLPEVLEYQVDNLEKLFNNILRDLQKSGKKRKKRGLKNVNT	498

FIG. 51

ATGCAAGATACCGCTACCTGCAGTATTTGTCAGGGGACGGGATTCGTAAA	
GACCGAAGACAACAAGGTAAGGCTCTGCGAATGCAGGTTCAAGAAAAGGG	100
ATGTAAACAGGGAACTAAACATCCCAAAGAGGTACTGGAACGCCAACTTA	
GACACTTACCACCCCAAGAACGTATCCCGAGAACAGGGCACTTTTGACGAT	200
AAGGGTCTTCGTCCACAACCTTCAATCCCGAGGAAGGGAAAGGGCTTACCT	
TTGTAGGATCTCCTGGAGTCGGCAAACTCACCTTGCGGTTGCAACATTA	300
AAAGCGATTTATGAGAAGAAGGGAATCAGAGGATACTTCTTCGATACGAA	
GGATCTAATATTCAGGTAAAAACACTTAATGGACGAGGGAAAGGATACAA	400
AGTTTTTAAAAACTGTCTTAAACTCACCGGTTTTTGGTTCTCGACGACCTC	
GGTTCTGAGAGGCTCAGTGACTGGCAGAGGGAACATCTCTTACATAAT	500
CACTTACAGGTATAACAACCTTAAGAGCACGATAATAACCACGAATTACT	
CACTCCAGAGGGAAGAAGAGAGTAGCGTGAGGATAAGTGCGGATCTTGCA	600
AGCAGACTCGGAGAAAACGTAGTTTCAAAAATTTACGAGATGAACGAGTT	
GCTCGTTATAAAGGGTTCGACCTCAGGAAGTCTAAAAGCTATCAACCC	700
CATCT	

FIG. 52

MQDTATCSICQGTGFVKTEDNKKVRLCECRFKKRDVNRELNIPKRYWNANL	
DTYHPKNVSQNRALLTIRVFVHNFNPPEGKGLTFVGSPGVGKTHLAVATL	100
KAIYEKKGIRGYFFDTKDILFRLKHLMDGKDTKFLKTVLNSPVLVDDL	
GSERLSDWQRELISYIITYRYNNLKSTIITTNYSLOREEESSVRISADLA	200
SRLGENVVSKIYEMNELLVIKGSDLRKS KKLSTPS	

FIG. 53

ATGAAAAAGATTGAAAATTTGAAGTGGAAAAATGTCTCGTTTAAAAGCCT	100
GGAAATAGATCCCGATGCAGGTGTGGTTCTCGTTTCCGTGGAAAAATTCT	
CCGAAGAGATAGAAGACCTTGTGCGTTTACTGGAGAAGAAGACGCGGTTT	200
CGAGTCATCGTGAACGGTGTTCAAAAAAGTAACGGGGATCTAAGGGGAAA	
GATACTTTCCCTTCTCAACGGTAATGTGCCTTACATAAAAGATGTTGTTT	300
TCGAAGGAAACAGGCTGATTCTGAAAGTGCTTGGAGATTTTCGCGCGGGAC	
AGGATCGCCTCCAACTCAGAAGCACGAAAAACAGCTCGATGAAC TGCT	400
GCCTCCCGGAACAGAGATCATGCTGGAGGTTGTGGAGCCTCCGGAAGATC	
TTTTGAAAAAGGAAGTACCACAACCAGAAAAGAGAGAAGAACC AAAGGT	500
GAAGAATTGAAGATCGAGGATGAAAACCATCTTTGGACAGAAACCCAG	
AAAGATCGTCTTCACCCCTCAAAAATCTTTGAGTACAACAAAAAGACAT	600
CGGTGAAGGGCAAGATCTTCAAAATAGAGAAGATCGAGGGGAAAAGAACG	
GTCCTTCTGATTTACCTGACAGACGGAGAAGATTCTCTGATCTGCAAAGT	700
CTTCAACGACGTTGAAAAGGTGGAAGGGAAAGTATCGGTGGGAGACGTGA	
TCGTTGCCACAGGAGACCTCCTTCTCGAAAACGGGGAGCCCACCCTTTAC	800
GTGAAGGGAATCACAACCTTCCCGAAGCGAAAAGGATGGACAAATCTCC	
GGTTAAGAGGGTGGAGCTCCACGCCCATACCAAGTTCAGCGATCAGGACG	900
CAATAACAGATGTGAACGAATATGTGAAACGAGCCAAGGAATGGGGCTTT	
CCCGCGATAGCCCTCACGGATCATGGGAACGTTTCAGGCCATACCTTACTT	1000
CTACGACGCGGCGAAAGAAGCTGGAATAAAGCCCATTTCGGTATCGAAG	
CGTATCTGGTGAGTGACGTGGAGCCCGTCATAAGGAATCTCTCCGACGAT	1100
TCGACGTTTGGAGATGCCACGTTTCGTCTGCTCGACTTCGAGACGACGGG	
TCTCGACCCGCAGGTGGATGAGATCATCGAGATAGGAGCGGTGAAGATAC	1200
AGGGTGGCCAGATAGTGGACGAGTACCACACTCTCATAAAGCCTTCCAGG	
GAGATCTCAAGAAAAAGTTTCGGAGATCACCGGAATCACTCAAGAGATGCT	1300
GGAAAACAAGAGAAGCATCGAGGAAGTTCTGCCGGAGTTCCTCGGTTTTTC	
TGGAAGATTCCATCATCGTAGCACACAACGCCAACTTCGACTACAGATTT	1400
CTGAGGCTGTGGATCAAAAAAGTGATGGGATTGGACTGGGAAAGACCCTA	
CATAGATACGCTCGCCCTCGCAAAGTCCCTTCTCAAAC TGAGAAGCTACT	1500
CTCTGGATTCCGTTGTGGAAAAGCTCGGATTGGGTCCCTTCCGGCACCAC	
AGGGCCCTGGATGACGCGAGGGTCACCGCTCAGGTTTTCTCAGGTTTCGT	1600
TGAGATGATGAAGAAGATCGGTATCACGAAGCTTTCAGAAATGGAGAAGT	
TGAAGGATACGATAGACTACACCGCGTTGAAACCCTTCCACTGCACGATC	1700
CTCGTTCAGAACAAAAAGGGATTGAAAAACCTATACAAACTGGTTTTCTGA	
TTCTATATAAAGTACTTCTACGGTGTTCCGAGGATCCTCAAAGTGAGC	1800
TCATCGAGAACAGAGAAGGACTGCTCGTGGGTAGCGCGTGTATCTCCGGT	
GAGCTCGGACGTGCCGCCCTCGAAGGAGCGAGTGATT CAGAACTCGAAGA	1900
GATCGCGAAGTTCTACGACTACATAGAAGTCATGCCGCTCGACGTTATAG	
CCGAAGATGAAGAAGACCTAGACAGAGAAAGACTGAAAGAAGTG TACCGA	2000
AAACTCTACAGAATAGCGAAAAAATTGAACAAGTTTCGTCGTCATGACCGG	
TGATGTTCAATTCCTCGATCCC GAAGATGCCAGGGGCAGAGCTGCACTTC	2100
TGGCACCTCAGGGAAACAGAACTTCGAGAATCAGCCCGCACTCTACCTC	
AGAACGACCGAAGAAATGCTCGAGAAGGCGATAGAGATATTCGAAGATGA	2200
AGAGATCGCGAGGGAAGTCGTGATAGAGAATCCCAACAGAA TAGCCGATA	
TGATCGAGGAAGTGCAGCCGCTCGAGAAAAA ACTTCACCCGCCGATCATA	2300
GAGAACGCCGATGAAATAGTGAGAAACCTCACCATGAAGCGGGCGTACGA	
GATCTACGGTGATCCGCTTCCCGAAATCGTCCAGAAGCGTGTGGAAAAGG	

FIG. 54A

AACTGAACGCCATCATAAATCATGGATACGCCGTTCTCTATCTCATCGCT	2400
CAGGAGCTCGTTTCAGAAATCTATGAGCGATGGTTACGTGGTTGGATCCAG	
AGGATCCGTCGGGTCTTCACTCGTGGCCAATCTCCTCGGAATAACAGAGG	2500
TGAATCCCCTACCACCACATTACAGGTGTCCAGAGTGCAAATACTTTGAA	
GTTGTCTGAAGACGACAGATACGGAGCGGGTTACGACCTTCCCAACAAGAA	2600
CTGTCCAAGATGTGGGGCTCCTCTCAGAAAAGACGGCCACGGCATAACCGT	
TTGAAACGTTTCATGGGGTTCGAGGGTGACAAGGTCCCCGACATAGATCTC	2700
AACTTCTCAGGAGAGTATCAGGAACGTGCTCATCGTTTTGTGGAAGAACT	
CTTCGGTAAAGACCACGTCTATAGGGCGGGAACCATAAACACCATCGCGG	2800
AAAGAAGTGCAGTGGGTACGTGAGAAGCTACGAAGAGAAAACCGGAAAG	
AAGCTCAGAAAGGCGGAAATGGAAAGACTCGTTTCCATGATCACGGGAGT	2900
GAAGAGAACGACGGGTACGACCCAGGGGGGCTCATGATCATAACCGAAAG	
ACAAAGAAGTCTACGATTTCACTCCCATAACAGTATCCAGCCAACGATAGA	3000
AACGCAGGTGTGTTCAACACGCACTTCGCATACGAGACGATCCATGATGA	
CCTGGTGAAGATAGATGCGCTCGGCCACGATGATCCCACTTTCATCAAGA	3100
TGCTCAAGGACCTCACCGGAATCGATCCCATGACGATTCCCATGGATGAC	
CCCGATACGCTCGCCATATTCACTTCTGTGAAGCCTCTTGGTGTGGATCC	3200
CGTTGAGCTGGAAAGCGATGTGGGAACGTACGGAATTCGGGAGTTCGGAA	
CCGAGTTTGTGAGGGGAATGCTCGTTGAAACGAGACCAAAGAGTTTCGCC	3300
GAGCTTGTGAGAATCTCAGGACTGTACACGGTACGGACGTCTGGTTGAA	
CAACGCACGTGATTGGATAAACCTCGGCTACGCCAAGCTCTCCGAGGTTA	3400
TCTCGTGTAGGGACGACATCATGAACCTCCTCATAACAAAGGAATGGAA	
CCGTCACCTTGCCCTTCAAGATCATGGAAAACGTACGGAAGGGAAAGGGTAT	3500
CACAGAAGAGATGGAGAGCGAGATGAGAAGGCTGAAGGTTCCAGAATGGT	
TCATCGAATCCTGTAAAAGGATCAAATATCTCTTCCCGAAAGCTCACGCT	3600
GTGGCTTACGTGAGTATGGCCTTCAGAATTGCTTACTTCAAGGTTCACTA	
TCCTCTTCAGTTTTACGCGGCGTACTTCACGATAAAAGGTGATCAGTTCG	3700
ATCCGGTTCTCGTACTCAGGGGAAAAGAAGCCATAAAGAGGCGCTTGAGA	
GAACTCAAAGCGATGCCTGCCAAAGACGCCCAGAAGAAAAACGAAGTGAG	3800
TGTTCTGGAGGTTGCCCTGGAAATGATACTGAGAGGTTTTCTTCTTCTAC	
CGCCCGACATCTTCAAATCCGACGCGAAGAAATTTCTGATAGAAGGAAAC	3900
TCGCTGAGAATTCCGTTCAACAACTTCCAGGACTGGGTGACAGCGTTGC	
CGAGTCGATAATCAGAGCCAGGGAAGAAAAGCCGTTCACTTCGGTGGAAG	4000
ATCTCATGAAGAGGACCAAGGTCAACAAAAATCACATAGAGCTGATGAAA	
AGCCTGGGTGTTCTCGGGACCTTCCAGAGACGGAACAGTTACGCTTTT	4100

C

FIG. 54B

MKKIENLKWKNVSFKSLEIDPDAGVVLVSVEKFSEEIEDLVRLLLEKKTRF	
RVIVNGVQKSNGDLRGKILSLNGNVPYIKDVVFEGNRLILKVLGDFARD	100
RIASKLRSTKKQLDELLPPGTEIMLEVVEPPEDLLKKEVPQPEKREEPKG	
EELKIEDENHIFGQKPRKIVFTPSKIFEYNKKTSVKGKIFKIEKIEGKRT	200
VLLIYLTGDGDSLICKVFNDVEKVEGKVSVDVIVATGDLLLENGEPTLY	
VKGITKLPEAKRMDKSPVKRVELHAHTKFSDQDAITDVNEYVKRAKEWGF	300
PAIALTDHGNVQAI PYFYDAAKEAGIKPIFGIEAYLVSDVEPVIRNLSDD	
STFGDATFVVLDFETTGLDPQVDEIIIEIGAVKIQGGQIVDEYHTLIKPSR	400
EISRKSSEITGITQEMLNKRSEIEVLPEFLGFLEDSIIIVAHNANFDYRF	
LRLWIKKVMGLDWERPYIDTLALAKSLLKLRSYSLSVVEKLGLGPFRHH	500
RALDDARVTAQVFLRFVEMMKIGITKLSEMEKLKDTIDYTALKPFHCTI	
LVQNKKGKLNLYKLVSDSYIKYFYGVPRILKSELNREGLLVGSACISG	600
ELGRAALEGASDSELEEIAKFYDYIEVMPLDVIAEDEEDLDRERLKEVYR	
KLYRIAKKLNKFVMTGDVHFLDPEDARGRAALLAPQGNRNFENQPALYL	700
RTTEEMLEKAIEIFEDEEIAREVVIENPNRIADMIEEVQPLEKKLHPPII	
ENADEIVRNLTMKRAYEIIYGDPLPEIVQKRVEKELNAIINHGYAVLYLIA	800
QELVQKSMSDGYVVGSRGSVGSSSLVANLLGITEVNPLPPHYRCPECKYFE	
VVEDDRYGAGYDLPNKNCPRCGAPLRKDGHGIPFETFMGFEGDKVPDIDL	900
NFSGEYQERAHRFVEELFGKDHVYRAGTINTIAERSAVGYVRSYEEKTGK	
KLRKAEMERLVSMITGVKRTTGQHPGGLMIIPKDKEYVDFTPIQYPANDR	1000
NAGVFTTHFAYETIHDDL VKIDALGHDDPTFIKMLKDLTGIDPMTIPMDD	
PDTLAI FSSVKPLGVDPVELESVDGTYGIPEFGTEFVRGMLVETRPKSFA	1100
ELVRISGLSHGTDVWLN NARDWINLGYAKLSEVISCRDDIMNFLIHKGME	
PSLAFKIMENVRKGKGITEEMESEMRRLKVPEWFIESCRIKYLFPKAHA	1200
VAYVSMAFRIAYFKVHYPLQFYAAYFTIKGDQFDPVLVLRGKEAIKRRLR	
ELKAMPAKDAQKNEVSVLEVALEMILRGFSFLPPDIFKSDAKKFLIEGN	1300
SLRIPFNKLPGLGDSVAESIIRAREEKPFSTSVEDLMKRTKVNKNHIELMK	
SLGVLGDLPETEQFTLF	1367

FIG. 55

GTGCTCGCCATGATATGGAACGACACCGTTTTTTGCGTCGTAGACACAGA	
AACCACGGGAACCGATCCCTTTGCCGGAGACCGGATAGTTGAAATAGCCG	100
CTGTTCCGTGTCTTCAAGGGGAAGATCTACAGAAACAAAGCGTTTCACTCT	
CTCGTGAATCCCAGAATAAGAATCCCTGCGCTGATTACAGAAAGTTACGG	200
TATCAGCAACATGGACATCGTGGAAGCGCCAGACATGGACACAGTTTACG	
ATCTTTTCAGGGATTACGTGAAGGGAACGGTGCTCGTGTTTCACAACGCC	300
AACTTCGACCTCACTTTTCTGGATATGATGGCAAAGGAAACGGGAACTT	
TCCAATAACGAATCCCTACATCGACACACTCGATCTTTCAGAAGAGATCT	400
TTGGAAGGCCTCATTCTCTCAAATGGCTCTCCGAAAGACTTGAATAAAA	
ACCACGATACGGCACCGTGCTCTTCCAGATGCCCTGGTGACCGCAAGAGT	500
TTTTGTGAAGCTTGTTGAATTTCTTGGTGAAAACAGGGTCAACGAATTCA	
TACGTGGAACACGGGGG	567

**FIG. 56**

MLAMIWNDTVFCVVDTETTGTDPFAGDRIVEIAAVPVFKGKIYRNKAFHS	
LVPNPRIRIPALIQKVHGISNMDIVEAPDMDTVYDLFRDYVKGTVLVFHNA	100
NFDLTFLDMMAKETGNFPITNPYIDTLDLSEEIFGRPHSLKWLSERLGIK	
TTIRHRALPDALVTARVFVKLVEFLGENRVNEFIRGKRG	189

**FIG. 57**

GTGGAAGTTCTTTACAGGAAGTACAGGCCAAAGACTTTTTCTGAGGTTGT	
CAATCAGGATCATGTGAAGAAGGCAATAATCGGTGCTATTCAGAAGAACA	100
GCGTGGCCACCGGATACATATTCGCCGGTCCGAGGGGAACGGGGAAGACT	
ACTCTTGCCAGAATTCTCGCAAATCCCTGAACTGTGAGAACAGAAAGGG	200
AGTTGAACCCTGCAATTCCTGCAGAGCCTGCAGAGAGATAGACGAGGGAA	
CCTTCATGGACGTGATAGAGCTCGACGCGGCCTCCAACAGAGGAATAGAC	300
GAGATCAGAAGAATCAGAGACGCCGTTGGATACAGGCCGATGGAAGGTAA	
ATACAAAGTCTACATAATAGACGAAGTTCACATGCTCACGAAAGAAGCCT	400
TCAACGCGCTCCTCAAAACACTCGAAGAACCTCCTCCCACGTCGTGTTC	
GTGCTGGCAACGACAAACCTTGAGAAGGTTCTCCCACGATTATCTCGAG	500
ATGTCAGGTTTTCTGAGTTCAGAAACATTCCCGACGAGCTCATCGAAAAGA	
GGCTCCAGGAAGTTGCGGAGGCTGAAGGAATAGAGATAGACAGGGAAGCT	600
CTGAGCTTCATCGCAAAAAGAGCCTCTGGAGGCTTGAGAGACGCGCTCAC	
CATGCTCGAGCAGGTGTGGAAGTTCTCGGAAGGAAAGATAGATCTCGAGA	700
CGGTACACAGGGCGCTCGGGTTGATACCGATACAGGTTGTTTCGCGATTAC	
GTGAACGCTATCTTTTCTGGTGATGTGAAAAGGGTCTTCACCGTTCTCGA	800
CGACGTCTATTACAGCGGGAAGGACTACGAGGTGCTCATTAGGAAGCAG	
TCGAGGATCTGGTCTGAAGACCTGGAAGGGAGAGAGGGGTTTACCAGGTT	900
TCAGCGAACGATATAGTTTCAAGTTTCGAGACAACCTTCTGAATCTTCTGAG	
AGAGATAAAGTTCGCCGAAGAAAAACGACTCGTCTGTAAAGTGGGTTTCGG	1000
CTTACATAGCGACGAGGTTCTCCACCACAAACGTTTCAAGAAAACGATGTC	
AGAGAAAAAACGATAATTCAAATGTACAGCAGAAAGAAGAGAAGAAAGA	1100
AACGGTGAAGGCCAAAAGAAGAAAAACAGGAAGACAGCGAGTTTCGAGAAAC	
GCTTCAAAGAACTCATGGAAGAACTGAAAGAAAAGGGCGATCTCTCTATC	1200
TTTGTGCTCTCAGCCTCTCAGAGGTGCAGTTTGACGGAGAAAAGGTGAT	
TATTTCTTTTGATTCATCGAAAGCTATGCATTACGAGTTGATGAAGAAAA	1300
AACTGCCTGAGCTGGAAAAACATTTTTTCTAGAAAACCTCGGGA AAAAAGTA	
GAAGTTGAACTTCGACTGATGGGAAAAGAAGAAACAATCGAGAAGGTTTC	1400
TCAGAAGATCCTGAGATTGTTTGAACAGGAGGGA	

FIG. 58

MEVLYRKYPKTFSEVVNQDHVKKAIIGAIQKNSVAHGFI FAGPRGTGKT	
TLARILAKSLNCENRKGVEPCNSCRACREIDEGTFMDVIELDAASNRGID	100
EIRRIRDAVGYPMEGKYKVYIIDEVHMLTKEAFNALLKTLEPPSHVVF	
VLATTNLEKVPPTIISRCQVFEFRNIPDELIEKRLQEVAAEGIEIDREA	200
LSFIAKRASGGLRDALTMLEQVWKFSEGTKIDLETVHRALGLIPIQVVRDY	
VNAIFSGDVKRVFTVLDDVYYSKDYEVLIQEAVEDLVEDLERERGVYQV	300
SANDIVQVSRQLLNLLREIKFAEEKRLVCKVGSAYIATRFSTTNVQENDV	
REKNDNSNVQQKEKKETVKAKEEKQEDSEFEKRFKELMEELKEKGDLSI	400
FVALSLSEVQFDGEKVIISFDSSKAMHYELMKKKLPELENIFSRKLGKKV	
EVELRLMGKEETIEKVSQKILRLFEOEQE	478

FIG. 59



ATGAAAGTAACCGTCACGACTCTTGAATTGAAAGACAAAATAACCATCGC	
CTCAAAAGCGCTCGCAAAGAAATCCGTGAAACCCATTCTTGCTGGATTTC	100
TTTTCGAAGTGAAAGATGGAAATTTCTACATCTGCGCGACCGATCTCGAG	
ACCGGAGTCAAAGCAACCGTGAATGCCGCTGAAATCTCCGGTGAGGCAG	200
TTTTGTGGTACCAGGAGATGTCATTGAGAAGATGGTCAAGGTTCTCCCAG	
ATGAGATAACGGAACCTTTCTTTAGAGGGGGATGCTCTTGTTATAAGTTCT	300
GGAAGCACCGTTTTTCAGGATCACCACCATGCCCGCGGACGAATTTCCAGA	
GATAACGCCTGCCGAGTCTGGAATAACCTTCGAAGTTGACACTTCGCTCC	400
TCGAGGAAATGGTTGAAAAGGTCATCTTCGCCGCTGCCAAAGACGAGTTC	
ATGCGAAATCTGAATGGAGTTTTCTGGGAACTCCACAAGAATCTTCTCAG	500
GCTGGTTGCAAGTGATGGTTTCAGACTTGCACTTGCTGAAGAGCAGATAG	
AAAACGAGGAAGAGGCGAGTTTCTTGCTCTCTTTGAAGAGCATGAAAGAA	600
GTTCAAAACGTGCTGGACAACACAACGGAGCCGACTATAACGGTGAGGTA	
CGATGGAAGAAGGGTTTCTCTGTCGACAAATGATGTAGAAACGGTGATGA	700
GAGTGGTCGACGCTGAATTTCCCGATTACAAAAGGGTGATCCCCGAAACT	
TTCAAAACGAAAGTGTTGGTTTCCAGAAAAGAACTCAGGGAATCTTTGAA	800
GAGGGTGATGGTGATTGCCAGCAAGGGAAGCGAGTCCGTGAAGTTCGAAA	
TAGAAGAAAACGTTATGAGACTTGTGAGCAAGAGCCCGATTATGGAGAA	900
GTGGTCGATGAAGTTGAAGTTCAAAAAGAAGGGGAAGATCTCGTGATCGC	
TTTCAACCCGAAGTTCATCGAGGACGTTTTTGAAGCACATTGAGACTGAAG	1000
AAATCGAAATGAACTTCGTTGATTCTACCAGTCCATGTCAGATAAATCCA	
CTCGATATTTCTGGATACCTTTACATAGTGATGCCCATCAGACTGGCA	1098

FIG. 60

MKVTVTTLLELKDKITIASKALAKKSVKPILAGFLFEVKDGNFYICATDLE	
TGVKATVNAAEISGEARFVVPGDVIQKMVKVLPDEITELSLLEGDALVISS	100
GSTVFRITTMPADEFPFITPAESGITFEVDTSLLEEMVEKVIFAAAKDEF	
MRNLNGVFWELHKNLLRLVASDGFRLALAEQIENEEASFLLSLKSMKE	200
VQNVLDNTTEPTITVRYDGRRVSLSTNDVETVMRVVDAEFPDYKRVIPET	
FKTKVVVSRKELRESLKRVMVIAASKGSESVKFEIEENVMLVSKSPDYGE	300
VVDEVEVQKEGEDLVIAFNPKFIEDVLKHIETEEIEMNFVDSTSPCQINP	
LDISGYLYIVMPIRLA	366

FIG. 61

ATGCCAGTCACGTTTCTCACAGGTACTGCAGAACTCAGAAGGAAGAATT	100
GATAAAGAACTCCTGAAGGATGGTAACGTGGAGTACATAAGGATCCATC	
CGGAGGATCCCGACAAGATCGATTTTCATAAGGTCTTTACTCAGGACAAAG	200
ACGATCTTTTCCAACAAGACGATCATTGACATCGTCAATTTTCGATGAGTG	
GAAAGCACAGGAGCAGAAGCGTCTCGTTGAACTTTTGAAAAACGTACCGG	300
AAGACGTTTCATATCTTCATCCGTTCTCAAAAAACAGGTGGAAAGGGAGTA	
GCGCTGGAGCTTCCGAAGCCATGGGAAACGGACAAGTGGCTTGAGTGGAT	400
AGAAAAGCGCTTCAGGGAGAATGGTTTGCTCATCGATAAAGATGCCCTTC	
AGCTGTTTTTCTCCAAGGTTGGAACGAACGACCTGATCATAGAAAGGGAG	500
ATTGAAAACTGAAAGCTTATTCGAGGACAGAAAGATAACGGTAGAAGA	
CGTGGAAGAGGTCGTTTTTACCTATCAGACTCCGGGATACGATGATTTTT	600
GCTTTGCTGTTTCCGAAGGAAAAAGGAAGCTCGCTCACTCTCTTCTGTCTG	
CAGCTGTGGAACACACAGAGTCCGTGGTGATTGCCACTGTCCTTGCGAA	700
TCACTTCTTGATCTCTTCAAAATCCTCGTTCTTGTGACAAAGAAAAGAT	
ACTACACCTGGCCTGATGTGTCCAGGGTGTCCAAAGAGCTGGGAATTCCC	800
GTTCCCTCGTGTGGCTCGTTTCTCGGTTTCTCCTTTAAGACCTGGAAATT	
CAAGGTGATGAACCACCTCCTCTACTACGATGTGAAGAAGGTTAGAAAGA	900
TACTGAGGGATCTCTACGATCTGGACAGAGCCGTGAAAAGCGAAGAAGAT	
CCAAACCGTTCTTCCACGAGTTCATAGAAGAGGTGGCACTGGATGTATA	972
TTCTCTTCAGAGAGATGAAGAA	

FIG. 62

MPVTFLTGTAEQKEELIKKLLKDG NVEYIRIHPEDPKIDFIRSLRLTK	100
TIFSNKTIIDIVNFDEWKAQEQRLVELLKNVPEDVHIFIRSQKTGGKGV	
ALELPKPWETDKWLEWIEKRFRENGLLIDKDALQLFFSKVGTNDLI IERE	200
IEKLKAYSEDRKITVEDVEEVVFTYQTPGYDDFCFAVSEGKRKLAHSLLS	
QLWKTTESVVIATVLANHFLDLFKILVLVTKKRYTWPDVSRVSKELGIP	300
VPRVARFLGFSFKTWKFKVMNHLLEYDVKKVRKILRDLYDLDRVVKSEED	
PKPFFHEFIEEVALDVYSLQDEE	

FIG. 63

ATGAACGATTTGATCAGAAAGTACGCTAAAGATCAACTGGAAACTTTGAA	?
AAGGATCATAGAAAAGTCTGAAGGAATATCCATCCTCATAAATGGAGAAG	100
ATCTCTCGTATCCGAGAGAAGTATCCCTTGAACCTCCCGAGTACGTGGAG	
AAATTTCCCCCGAAGGCCTCGGATGTTCTGGAGATAGATCCCGAGGGGGA	200
GAACATAGGCATAGACGACATCAGAACGATAAAGGACTTCCTGAACTACA	
GCCCCGAGCTCTACACGAGAAAGTACGTGATAGTCCACGACTGTGAAAGA	300
ATGACCCAGCAGGCGGCGAACGCGTTTCTGAAGGCCCTTGAAGAACCACC	
AGAATACGCTGTGATCGTTCTGAACACTCGCCGCTGGCATTATCTACTGC	400
CGACGATAAAGAGCCGAGTGTTTCAGAGTGGTTGTGAACGTTCCAAAGGAG	
TTCAGAGATCTCGTGAAAGAGAAAATAGGAGATCTCTGGGAGGAACTTCC	500
ACTTCTTGAGAGAGACTTCAAAACGGCTCTCGAAGCCTACAACTTGGTG	
CGGAAAAACTTTCTGGATTGATGGAAAGTCTCAAAGTTTGGAGACGGAA	600
AAACTCTTGAAAAAGGTCTTTTCAAAGGCCTCGAAGGTTATCTCGCATG	
TAGGGAGCTCCTGGAGAGATTTTCAAAGGTGGAATCGAAGGAATTCTTTG	700
CGCTTTTGTGATCAGGTGACTAACACGATAACAGGAAAAGACGCGTTTCTT	
TTGATCCAGAGACTGACAAGAATCATTCTCCACGAAAACACATGGGAAAG	800
CGTTGAAGATCAAAAAGCGTGTCTTTCCTCGATTCAATTCTCAGGGTGA	
AGATAGCGAATCTGAACAACAACTCACTCTGATGAACATCCTCGCGATA	900
CACAGAGAGAGAAAGAGAGGTGTCAACGCTTGGAGC	

FIG. 64

MNDLIRKYAKDQLETLKRIIEKSEGISILINGEDLSYPREVSLELPEYVE	
KFPPKASDVLEIDPEGENIGIDDIRTIKDFLNYSPELYTRKYVIVHDCER	100
MTQQAANAFLKALEEPPEYAVIVLNTRRWYLLPTIKSRVFRVVVNPKE	
FRDLVKEKIGDLWEELPLLERDFKTALEYKLGAEKLSGLMESLKVLETE	200
KLLKKVLSKGLEGYLACRELLERFSKVESKEFFALFDQVTNTITGKDAFL	
LIQRLTRIILHENTWESVEDKSVSFLDSILRVKIANLNNKLTLMNILAIH	300
RERKRGVNAWS	

FIG. 65

ATGTCCTTTCTTCAACAAGATCATACTCATAGGAAGACTCGTGAGAGATCC  
 CGAAGAGAGATACACGCTCAGCGGAACTCCAGTCACCACCTTCACCATAG 100  
 CGGTGGACAGGGTTCCCAGAAAGAACGCGCCGGACGACGCTCAAACGACT  
 GATTTCTTCAGGATCGTCACCTTTGGAAGACTGGCAGAGTTCGCTAGAAC 200  
 CTATCTCACCAAAGGAAGGCTCGTTCTCGTCGAAGGTGAAATGAGAATGA  
 GAAGATGGGAAACACCCACTGGAGAAAAGAGGGTATCTCCGGAGGTTGTC 300  
 GCAAACGTTGTTAGATTCATGGACAGAAAACCTGCTGAAACAGTTAGCGA  
 GACTGAAGAGGAGCTGGAAATACCGGAAGAAGACTTTTCCAGCGATACCT 400  
 TCAGTGAAGATGAACCACCATTT

FIG. 66

MSFFNKIILIGRLVRDPEERYTLSGTPVTTFTIAVDRVPRKNAPDDAQT  
 DFFRIVTFGRLAEFARTYLTGRLVLVEGEMRMRWETPTGEKRVSPVV 100  
 ANVVRFMDRKPAETVSETEEELEIPEEDFSSDTFSEDEPPF

FIG. 67

ATGCGTGTTCCTCCCGCACAACTTAGAGGCCGAAGTTGCTGTGCTCGGAAG	100
CATATTGATAGATCCGTCGGTAATAAACGACGTTCTTGAAATTTTGAGCC	
ACGAAGATTTCTATCTGAAAAAACACCAACACATCTTCAGAGCGATGGAA	200
GAGCTTTACGACGAAGGAAAACCGGTGGACGTGGTTTCCGTCTGTGACAA	
GCTTCAAAGCATGGGAAAACCTCGAGGAAGTAGGTGGAGATCTGGAAGTGG	300
CCCAGCTCGCTGAGGCTGTGCCAGTTCTGCACACGCACTTCACTACGCG	
GAGATCGTCAAGGAAAAATCCATTCTGAGGAACTCATTGAGATCTCCAG	400
AAAAATCTCAGAAAGTGCCTACATGGAAGAAGATGTGGAGATCCTGCTCG	
ACAACGCAGAAAAGATGATCTTCGAGATCTCAGAGATGAAAACGACAAAA	500
TCCTACGATCATCTGAGAGGCATCATGCACCGGGTGTGAAAACCTGGA	
GAAGTTTCAGGGAAAGAGCCAACCTTATAGAACCCGGTGTGCTCATAACGG	600
GACTACCAACGGGATTCAAAAGTCTGGACAAACAGACCACAGGGTTCCAC	
AGCTCCGATCTGGTGATAATAGCAGCGAGACCCTCCATGGGAAAAACCTC	700
CTTCGCACTCTCAATAGCGAGGAACATGGCTGTCAATTTCGAAATCCCCG	
TCGGAATATTCAGTCTCGAGATGTCCAAGGAACAGCTCGCTCAAAGACTA	800
CTCAGCATGGAGTCCGGTGTGGATCTTTACAGCATCAGAACAGGATACCT	
GGATCAGGAGAAGTGGGAAAGACTACAATAGCGGCTTCTAAACTCTACA	900
AAGCACCATAGTTGTGGACGATGAGTCACTCCTCGATCCGCGATCGTTG	
AGGGCAAAGCGAGAAGGATGAAAAAGAATACGATGTAAAAGCCATTTT	1000
TGTCGACTATCTCCAGCTCATGCACCTGAAAGGAAGAAAAGAAAGCAGAC	
AGCAGGAGATATCCGAGATCTCGAGATCTCTGAAGCTCCTTGCGAGGGAA	1100
CTCGACATAGTGGTGATAGCGCTTTCACAGCTTTCGAGGGCCGTAGAACA	
GAGAGAAGACAAAAGACCGAGGCTGAGTGACCTCAGGGAATCCGGTGCGA	1200
TAGAACAGGACGCAGACACAGTCATCTTCATCTACAGGGAGGAATATTAC	
AGGAGCAAAAAATCCAAAGAGGAAAGCAAGCTTCACGAACCTCACGAAGC	1300
TGAAATCATAATAGGTAAACAGAGAAACGGTCCCGTTGGAACGATCACTC	
TGATCTTCGACCCAGAACGGTTACGTTCCATGAAGTCGATGTGGTGCAT	1353
TCA	

FIG. 68

MRVPPHNLEAEVAVLGSILIDPSVINDVLEILSHEDFYLKKHQHIFRAME	100
ELYDEGKPVVDVSVCDKLQSMGKLEEVGGDLEVAQLAEAVPSSAHALHYA	
EIVKEKSILRKLIIEISRKISESAYMEEDVEILLDNAEKMIFEISEMKTTK	200
SYDHLRGIMHRVFENLENFRERANLIEPGVLITGLPTGFKSLDKQTTGFH	
SSDLVIIAARPSMGKTSFALS IARNMAVNFEIPVGIFSLEMSKEQLAQL	300
LSMESGVDLYSIRTGYLDQEKWERLTIAASKLYKAPIVVDDESLLDPRSL	
RAKARRMKKEYDVKAIFVDYLQMLHLKGRKESRQQEISEISRLKLLARE	400
LDIVVIALSQLSRAVEQREDKRPRLSDLRESGAIEQDADTVIFIFYREEYY	
RSKKSKEESKLHEPHEAEIIIGKQRNGPVGITITLIFDPRTVTTFHEVDVH	451
S	

FIG. 69

GTGATTCTCGAGAGGTCATCGAGGAAATAAAAGAAAAGGTTGACATCGT	100
AGAGGTCATTTCCGAGTACGTGAATCTTACCCGGGTAGGTTCTCTCTACA	
GGGCTCTCTGTCCCTTTTCATTTCAGAAACCAATCCTTCTTTCTACGTTTCAT	200
CCGGGTTTGAAGATATACCATTTGTTTCGGCTGCGGTGCGAGTGGAGACGT	
CATCAAATTTCTTCAAGAAATGGAAGGGATCAGTTTCCAGGAAGCGCTGG	300
AAAGACTTGCCAAAAGAGCTGGGATTGATCTTTCTCTCTACAGAACAGAA	
GGGACTTCTGAATACGGAAAATACATTTCGTTTGTACGAAGAAACGTGGAA	400
AAGGTACGTCAAAGAGCTGGAGAAATCGAAAGAGGCCAAAAGACTATTTAA	
AAAGCAGAGGCTTCTCTGAAGAAGATATAGCAAAGTTTCGGCTTTGGGTAC	500
GTCCCCAAGAGATCCAGCATCTCTATAGAAGTTGCAGAAGGCATGAACAT	
AACACTGGAAGAACTTGTTCAGATACGGTATCGCGCTGAAAAAGGGTGATC	600
GATTCGTTGATAGATTTCGAAGGAAGAATCGTTGTTCCAATAAAGAACGAC	
AGTGGTCATATTGTGGCTTTTGGTGGGCGTGCTCTCGGCAACGAAGAACC	700
GAAGTATTTGAACTCTCCAGAGACCAGGTATTTTTCGAAGAAGAAGACCC	
TTTTTCTCTTCGATGAGGCGAAAAAAGTGGCAAAAGAGGTTGGTTTTTTC	800
GTCATACCGAAGGCTACTTCGACGCGCTCGCATTTCAGAAAGGATGGAAT	
ACCAACGGCGGTGCTGTTCTTGGGGCGAGTCTTTCAAGAGAGGCGATTCT	900
TAAAACTTTCGGCGTATTCGAAAAACGTCATACTGTGTTTCGATAATGAC	
AAAGCAGGCTTCAGAGCCACTCTCAAATCCCTCGAGGATCTCCTAGACTA	1000
CGAATTC AACGTGCTTGTGGCAACCCCTCTCCTTACAAAGACCCAGATG	
AACTCTTTCAGAAAGAAGGAGAAGGTTTCATTGAAAAAGATGCTGAAAAAC	1100
TCGCGTTTCGTTTCAATATTTTCTGGTGACGGCTGGTGAGGTCTTCTTTGA	
CAGGAACAGCCCCGCGGGTGTGAGATCCTACCTTTCTTTCTCAAAGGTT	1200
GGGTCCAAAAGATGAGAAGGAAAGGATATTTGAAACACATAGAAAATCTC	
GTGAATGAGGTTTTCATCTTCTCTCCAGATACCAGAAAACCAGATTTTGAA	1300
CTTTTTTTGAAAGCGACAGGTCTAACACTATGCCTGTTTCATGAGACCAAGT	
CGTCAAAGGTTTACGATGAGGGGAGAGGACTGGCTTATTTGTTTTTGAAC	1400
TACGAGGATTTGAGGGAAAAGATTCTGGAAGTGGACTTAGAGGTACTGGA	
AGATAAAAACGCGAGGGAGTTTTTCAAGAGAGTCTCACTGGGAGAAGATT	1500
TGAACAAAGTCATAGAAAACCTCCCAAAGAGCTGAAAGACTGGATTTTTT	
GAGACAATAGAAAGCATTCTCTCTCCAAAGGATCCCGAGAAATTCCTCGG	1600
TGACCTCTCCGAAAAGTTGAAAATCCGACGGATAGAGAGACGTATCGCAG	
AAATAGATGATATGATAAAGAAAGCTTCAAACGATGAAGAAAGGCGTCTT	1695
CTTCTCTCTATGAAAGTGGATCTCCTCAGAAAAATAAAGAGGAGG	

FIG. 70

MIPREVIEEIKEKVDIVEVISEYVNLTRVGSSYRALCPFHSETNPSFYVH	
PGLKIYHCFGCGASGDVIKFLQEMEGISFQEALERLAKRAGIDLSLYRTE	100
GTSEYGKYIRLYEETWKRYVKELEKSKEAKDYLSRGFSEEDIAKFGFGY	
VPKRSSISIEVAEGMNITLEELVRYGIALKKGDRFVDRFEGRIVVPIKND	200
SGHIVAFGGRALGNEEPKYLNSPETRYFSKKKTLFLFDEAKKVAKEVGFF	
VITEGYFDALAFRKDGIPTAVAVLGASLSREAILKLSAYSKNVILCFDND	300
KAGFRATLKSLEDLLDYEFNVLVATPSPYKDPDELFOKEGEGSLKKMLKN	
SRSFEYFLVTAGEVFFDRNSPAGVRSYLSFLKGWVQKMRKGYLKHENL	400
VNEVSSSLQIPENQILNFFESDRSNTMPVHETKSSKVYDEGRGLAYLFLN	
YEDLREKILELDLEVLLEDKNAREFFKRVSLGEDLNKVIENFPKELKDWIF	500
ETIESIPPPKDPEKFLGDLSEKLKIRRIERRIAEIDDMIKKASNDEERRL	
LLSMKVDLLRKIKRR	565

FIG. 71

ATGGCTCTACACCCGGCTCACCCTGGGGCAATAATCGGGCACGAGGCCGT	
TCTCGCCCTCCTTCCCCGCCTCACCGCCAGACCCTGCTCTTCTCCGGCC	100
CCGAGGGGGTGGGGCGGCGCACCGTGGCCCGCTGGTACGCCTGGGGGCTC	
AACCGCGGCTTCCCCCGCCCTCCCTGGGGGAGCACCCGGACGTCCTCGA	200
GGTGGGGCCCAAGGCCCGGGACCTCCGGGGCCGGGCCGAGGTGCGGCTGG	
AGGAGGTGGCGCCCTCTTGAGTGCTCCAGCCACCCCGGGAGCGG	300
GTGAAGGTGGCCATCCTGGACTCGGCCACCTCCTCACCGAGGCCGCCGC	
CAACGCCCTCCTCAAGCTCCTGGAGGAGCCCCCTTCTACGCCCGCATCG	400
TCCTCATCGCCCCAAGCCGCGCCACCCTCCTCCCCACCCTGGCCTCCCGG	
GCCACGGAGGTGGCATTGCCCCCGTGCCCGAGGAGGCCCTGCGCGCCCT	500
CACCCAGGACCCGGAGCTCCTCCGCTACGCCGCGGGGCCCCGGGCCGCC	
TCCTTAGGGCCCTCCAGGACCCGGAGGGGTACCGGGCCCGCATGGCCAGG	600
GCGCAAAGGGTCTTGAAAGCCCCGCCCTGGAGCGCCTCGCTTTGCTTCG	
GGAGCTTTTGGCCGAGGAGGGGGTCCACGCCCTCCACGCCGTCCTAA	700
AGCGCCCGGAGCACCTCCTTGCCCTGGAGCGGGCGCGGGAGGCCCTGGAG	
GGGTACGTGAGCCCCGAGCTGGTCCTCGCCCGGCTGGCCTTAGACTTAGA	800
GACA	

FIG. 72

MALHPAHPGAIIGHEAVLALLPRLTAQTLLFSGPEGVGRRTVARWYAWGL	
NRGFPPPSLGEHPDVLEVGPKARDLRGRAEVRLEEVAPLLEWCSSHPRER	100
VKVAILDSAHLLTEAAANALLKLEPPSYARIVLIAPSRATLLPTLASR	
ATEVAFAPVPEEALRALTDPELLRYAAGAPGRLLRALQDPEGYRARMAR	200
AQRVLKAPPLERLALLRELLAE EEGVHALHAVLKRPEHLLALERAREALE	
GYVSPVLARLALDLET	268

FIG. 73

ATGCTGGACCTGAGGGAGGTGGGGGAGGCGGAGTGGAAAGGCCCTAAAGCC	
CCTTTTGAAAGCGTGCCCGAGGGCGTCCCCGTCCTCCTCCTGGACCCTA	100
AGCCAAGCCCCTCCCGGGCGGCCTTCTACCGGAACCGGGAAAGGCGGGAC	
TTCCCCACCCCCAAGGGGAAGGACCTGGTGCGGCACCTGGAAAACCGGGC	200
CAAGCGCCTGGGGCTCAGGCTCCCGGGCGGGGTGGCCAGTACCTGGCCT	
CCCTGGAGGGGGACCTCGAGGCCCTGGAGCGGGAGCTGGAGAAGCTTGCC	300
CTCCTCTCCCCACCCCTCACCTGGAGAAGGTGGAGAAGGTGGTGGCCCT	
GAGGCCCCCCTCACGGGCTTTGACCTGGTGCGCTCCGTCTGGAGAAGG	400
ACCCAAGGAGGCCCTCCTGCGCCTAGGCGGCCTCAAGGAGGAGGGGGAG	
GAGCCCCTCAGGCTCCTCGGGGCCCTCTCCTGGCAGTTCGCCCTCCTCGC	500
CCGGGCCTTCTTCTCCTCCGGGAAAACCCCAAGGAGGAGGACC	
TCGCCCCGCTCGAGGCCACCCCTACGCCGCCCGCCGCGCCCTGGAGGCG	600
GCGAAGCGCCTCACGGAAGAGGCCCTCAAGGAGGCCCTGGACGCCCTCAT	
GGAGGCGGAAAAGAGGGCCAAGGGGGGAAAGACCCGTGGCTCGCCCTGG	700
AGGCGGCGGTCTCCGCCTCGCCCCGTTGA	

**FIG. 74**

MVIAFTGDPFLAREALLEEARLRGLSRFTEPTPEALAQALAPGLFGGGGA	
MLDLREVGEAEWKALKPLLESVPEGVPVLLLDPKPSPSRAAFYRNRERRD	100
FPTPKGKDLVRHLENRAKRLGLRLPGGVAQYLASLEGDLEALERELEKLA	
LLSPPLTLEKVEKVVALRPPLTGFDLVRSVLEKDPKEALLRLGGLKEEGE	200
EPLRLLGALSWQFALLARAFFLLRENPRPKEEDLARLEAHPYAARRALEA	
AKRLTEEALKEALDALMEAEKRAKGGKDPWLALEAAVLRRLAR	292

**FIG. 75**



ATGGCTCGAGGCCTGAACCGCGTTTTCTCATCGGCGCCCTCGCCACCCG	100
GCCGGACATGCGCTACACCCCGGCGGGGCTCGCCATTTTGGACCTGACCC	
TCGCCGGTCAGGACCTGCTTCTTTCCGATAACGGGGGGGAACCGGAGGTG	200
TCCTGGTACCACCGGGTGAGGCTCTTAGGCCGCCAGGCGGAGATGTGGGG	
CGACCTCTTGGAACCAAGGGCAGCTCGTCTTCGTGGAGGGCCGCCTGGAGT	300
ACCGCCAGTGGGAAAGGGAGGGGGAGAAGCGGAGCGAGCTCCAGATCCGG	
GCCGACTTCCGGACCCCTGGACGACCGGGGGAAGAAGCGGGCGGAGGAC	400
AGCCGGGGCCAGCCAGGCTCCGCGCCGCCCTGAACCAGGTCTTCCTCAT	
GGGCAACCTGACCCGGGACCCGGAACCTCCGCTACACCCCCAGGGCACCG	500
CGGTGGCCCGGCTGGGCCTGGCGGTGAACGAGCGCCGC CAGGGGGCGGAG	
GAGCGCACCCACTTCGTGGAGGTT CAGGCCTGGCGCGA CCTGGCGGAGTG	600
GGCCGCCGAGCTGAGGAAGGGCGACGGCCTTTTCGTGATCGGCAGGTTGG	
TGAACGACTCCTGGACCAGCTCCAGCGGCGAGCGGCGCTTCCAGACCCGT	700
GTGGAGGCCCTCAGGCTGGAGCGCCCCACCCGTGGACCTGCCCAGGCCTG	
CCCAGGCCGGCGGAACAGGTCCCGCGAAGTCCAGACGGGTGGGGTGGACA	800
TTGACGAAGGCTTGGAAGACTTTCGCCCGGAGGAGGATTTGCCGTTTGA	
GCACGAA	

FIG. 76

MARGLNRVFLIGALATRPDMRYTPAGLAILDLTLAGQDLLLSDNNGGEPEV	100
SWYHRVRLLGQAEMWGDLDDQGQLVFVEGRLEYRQWEREGEKRSELQIR	
ADFLDPLDDRGKKRAEDSRGQPRRLRAALNQVFLMGNLTRDPELRYTPQGT	200
AVARLGLAVNERRQGAERTHFVEVQAWRDLAEWAAELRKGDGLFVIGRL	
VNDSWTSSSGERRFQTRVEALRLRPTRGPAQACPGRRNRSREVQTGGVD	266
IDEGLEDFPPEEDLPF	

FIG. 77

AATTCCGACATTTCAATTGAATCGTTTATTCCGCTTGAAAAAGAAGGCAA	100
GTTGCTCGTTGATGTGAAAAGACCGGGGAGCATCGTACTGCAGGCGCGCT	
TTTTCTCTGAAATCGTGAAAAAACTGCCGCAACAAACGGTGGAATCGAA	200
ACGGAAGACAACCTTTTGACGATCATCCGCTCGGGGCACTCAGAATTCCG	
CCTCAATGGGCTAAACGCCGACGAATATCCGCGCCTGCCGCAAATTGAAG	300
AAGAAAACGTGTTTCAAATCCCGGCTGATTTATTGAAAACCGTGATTCCG	
CAAACGGTGTTTCGCCGTTTCTACATCGGAAACGCGCCCAATCTTGACAGG	400
TGTCAACTGGAAAGTTGAACATGGCGAGCTTGTCTGCACAGCGACCGACA	
GTCATCGCTTAGCCATGCGCAAAGTGAAAATTGAGTCGGAAAATGAAGTA	500
TCATACAACGTCGTCATCCCTGGAAAAAGTCTTAATGAGCTCAGCAAAT	
TTTGGATGACGGCAACCACCGGTGGACATCGTCATGACAGCCAATCAAG	600
TGCTATTTAAGGCCGAGCACCTTCTCTTCTTTTCCCGGCTGCTTGACGGC	
AACTATCCGGAGACGGCCCGCTTGATTCCAACAGAAAGCAAACGACCAT	700
GATCGTCAATGCAAAGAGTTTCTGCAAGCAATCGACCGAGCGTCCTTGC	
TTGCTCGAGAAGGAAGGAACAACGTTGTGAAACTGACGACGCTTCCTGGA	800
GGAATGCTCGAAATTTCTTCGATTTCTCCGAGATCGGGAAAGTGACGGAG	
CAGCTGCAAACGGAGTCTCTTGAAGGGGAAGAGTTGAACATTTTCGTTTCA	900
CGCGAAATATATGATGGACGCGTTGCGGGCGCTTGATGGAACAGACATTT	
CAAATCAGCTTCACTGGGGCCATGCGGCCGTTCTCTGTTGCGCCCGCTTCA	992
ACCGATTGATGCTTCAGCTCATTTTGCCGGTGAGAACATAT	

FIG. 78

NSDISIIIESFIPLEKEGKLLVDVKRPGSIVLQARFFSEIVKKLPQQTVEI	100
ETEDNFLTIIIRSGHSEFRLNGLNADEYPRLPQIEEENVFQIPADLLKTVI	
RQTVFAVSTSETRPILTGVDNWKVEHGELVCTATDSHRLAMRKVKII ESEN	200
EVSYNVVI PGKSLNELSKI ILDDGNHPVDIVMTANQVLFKAHLLFFSRL	
LDGNYPETARLIPTESKTTMIVNAKEFLQ AIDRASLLAREGRNNVVKLTT	300
LPGGMLEISSISPEIGKVTEQLQTESLEGEELNISFS AKYMMDALRALDG	
TDIQISFTGAMRPFLRLPLHTDSMLQLILPVRTY	

FIG. 79

ATGATTAACCGCGTCATTTTGGTCGGCAGGTAAACGAGAGATCCGGAGTT	
GCGTTACACTCCAAGCGGAGTGGCTGTTGCCACGTTTACGCTCGCGGTCA	100
ACCGTCCGTTTACAAATCAGCAGGGCGAGCGGGAAACGGATTTTATTCAA	
TGTGTCGTTTGGCGCCGCCAGGCGGAAAACGTGCGCAAATTTTGGAAAA	200
GGGGAGCTTGGCTGGTGTGATGGCCGACTGCAAACCCGCAGCTATGAAA	
ATCAAGAAGGTGCGCGTGTGTACGTGACGGAAGTGGTGGCTGATAGCGTC	300
CAATTTCTTGAGCCGAAAGGAACGAGCGAGCAGCGAGGGGCGACAGCAGG	
CGGCTACTATGGGGATCCATTCCCATTGCGGCAAGATCAGAACCACCAAT	400
ATCCGAACGAAAAAGGGTTTGGCCGCATCGATGACGATCCTTTCGCCAAT	
GACGGCCAGCCGATCGATATTTCTGATGATGATTGCCGTTT	492

FIG. 80

MINRVILVGRLTRDPELRYTPSGVAVATFTLAVNRPFTNQSYENQEGRRV	
YVTEVVADSVQFLEPKGTSEQRGATAGGYQGERETDFIQCVVWRRQAEN	100
VANFLKKGSLAGVDGRLQTRGDPFPFGQDQNHQYPNEKGFGRIDDDPFAN	
DGQPIDISDDDLPF	164

FIG. 81

ATGCTGGAACGCGTATGGGGAAACATTGAAAAACGGCGTTTTTCTCCCCT	
TTATTTATTATACGGCAATGAGCCGTTTTTTATTAACGGAAACGTATGAGC	100
GATTGGTGAACGCAGCGCTTGGCCCCGAGGAGCGGGAGTGGAACCTGGCT	
GTGTACGACTGCGAGGAAACGCCGATCGAGGCGGCGCTTGAGGAGGCCGA	200
GACGGTGCCGTTTTTTCGGCGAGCGGCGTGTCAATTCTCATCAAGCATCCAT	
ATTTTTTTTACGTCTGAAAAAGAGAAGGAGATCGAACATGATTTGGCGAAG	300
CTGGAGGCGTACTTGAAGGCGCCGTGCGCCGTTTTTCGATCGTCGTCTTTTT	
CGCGCCGTACGAGAAGCTTGATGAGCGAAAAAAATTACGAAGCTCGCCA	400
AAGAGCAAAGCGAAGTCGTCATCGCCGCCCGCTCGCCGAAGCGGAGCTG	
CGTGCCCTGGGTGCGGCGCCGCATCGAGAGCCAAGGGGCGCAAGCAAGCGA	500
CGAGGCGATTGATGTCCTGTTGCGGCGGGCCGGGACGCAGCTTTCGCCT	
TGGCGAATGAAATCGATAAATTGGCCCTGTTTGCCGGATCGGGCGGAACC	600
ATCGAGGCGGCGGCGGTTGAGCGGCTTGTGCCCCGCACGCCGAAGAAAA	
CGTATTTGTGCTTGTGAGCAAGTGGCGAAGCGCGACATTCCAGCAGCGT	700
TGCAGACGTTTTATGATCTGCTTGAAAACAATGAAGAGCCGATCAAAATT	
TTGGCGTTGCTCGCCGCCCATTTCCGCTTGCTTTCGCAAGTGAAATGGCT	800
TGCCTCCTTAGGCTACGGACAGGCGCAAATTGCTGCGGCGCTCAAGGTGC	
ACCCGTTCCGCGTCAAGCTCGCTCTTGCTCAAGCGGCCCGCTTCGCTGAC	900
GGAGAGCTTGCTGAGGCGATCAACGAGCTCGCTGACGCCGATTACGAAGT	
GAAAAGCGGGGCGGTGATCGCCGGTTGGCCGTTGAGCTGCTTCTGATGC	1000
GCTGGGGCGCCCGCCCGGCGCAAGCGGGGCGCCACGGCCGGCGG	

FIG. 82

MLERVWGNIEKRRFSPLYLLYGNEPFLLTETYERLVNAALGPEEREWNLA	
VYDCEETPIEAALEEAETVPFFGERRVILIKHPYFFTSEKEKEIEHDLAK	100
LEAYLKAPSPFSIVVFFAPYEKLDERKKITKLAKSEQSEVVIAAPLAEEL	
RAWVRRRIESQGAQASDEAIDVLLRRAGTQLSALANEIDKLALFAGSGGT	200
IEAAVERLVARTPEENVFVLVEQVAKRDI PAALQTFYDLLENNEEPIKI	
LALLAAHFRLLSQVKWLASLGYGQAQIAAALKVHPFRVKLALAQAARFAD	300
GELAEAINELADADYEVKSGAVDRRLAVELLMRWGARPAQAGRHR	

FIG. 83

ATGCGATGGGAACAGCTAGCGAAACGCCAGCCGGTGGTGGCGAAAATGCT	100
GCAAAGCGGCTTGGA AAAAGGGCGGATTTCTCATGCGTACTTGTTTGAGG	
GGCAGCGGGGACGGGCAAAAAGCGGCCAGTTTGTTGTTGGCGAAACGT	200
TTGTTTTGTCTGTCCCCAATCGGAGTTTCCCCGTGTCTAGAGTGCCGCAA	
CTGCCGGCGCATCGACTCCGGCAACCACCCTGACGTCCGGGTGATCGGCC	300
CAGATGGAGGATCAATCAAAAAGGAACAAATCGAATGGCTGCAGCAAGAG	
TTCTCGAAAACAGCGGTGCGAGTCGGATAAAAAAATGTACATCGTTGAGCA	400
CGCCGATCAAATGACGACAAGCGCTGCCAACAGCCTTCTGAAATTTTTGG	
AAGAGCCGCATCCGGGGACGGTGGCGGTATTGCTGACTGAGCAATACCAC	500
CGCCTGCTAGGGACGATCGTTTCCCGCTGTCAAGTGCTTTCGTTCCGGCC	
GTTGCCGCCGGCAGAGCTCGCCCAGGGACTTGTCGAGGAGCACGTGCCGT	600
TGCCGTTGGCGCTGTTGGCTGCCCATTTGACAAACAGCTTCGAGGAAGCA	
CTGGCGCTTGCCAAAGATAGTTGGTTTGCCGAGGCGCGAACATTAGTGCT	700
ACAATGGTATGAGATGCTGGGCAAGCCGAGCTGCAGCTTTTGTTTTTCA	
TCCACGACCGCTTGTTCCGCATTTTTTGGAAGCCATCAGCTTGACCTT	757
GGACTTG	

FIG. 84

MRWEQLAKRQPVVAKMLQSGLEKGRISHAYLFEGQRG TGKKAASLLAKR	100
LFCLSPIGVSPCLECRNCRRIDSGNHPDVRVIGPDGGS IKKEQIEWLQQE	
FSKTAVESDKMYIVEHADQMTTSAANSLLKFLEEPHPGTVAVLLTEQYH	200
RLLGTVSRQVLSFRPLPPAELAQGLVEEHVPLPLALLAAHLTNSFEEA	
LALAKDSWFAEARTLVLQWYEMLGKPELQLLFFIHDRLFPHFLESHQLDL	252
GL	

FIG. 85

GTGGCATACCAAGCGTTATATCGCGTGTTTCGGCCGCAGCGCTTTGCGGA	100
CATGGTCGGCCAAGAACACGTGACCAAGACGTTGCAAAGCGCCCTGCTTC	
AACATAAAATATCGCACGCTTACTTATTTTCCGGCCCCGCGCGGTACAGGA	200
AAAACGAGCGCAGCGAAAATTTTCGCCAAGGCGGTCAACTGTGAACAGGC	
GCCAGCGGCGGAGCCATGCAATGAGTGTCCAGCTTGCCTCGGCATTACGA	300
ATGGAACGGTTCCCGATGTGCTGGAAATTGACGCTGCTTCCAACAACCGC	
GTCGATGAAATTCGTGATATCCGTGAGAAGGTGAAATTTGCGCCAACGTC	400
GGCCCGCTACAAAGTGTATATCATCGACGAGGTGCATATGCTGTGCGATCG	
GTGCGTTTAAACGCGCTGTTGAAAACGTTGGAGGAGCCGCCGAAACACGTC	500
ATTTTCATTTTGGCCACGACCGAGCCGCACAAAATTCGGGCGACGATCAT	
TTCCCGCTGCCAACGGTTCGATTTTCGCCGCATCCCGCTTCAGGCGATCG	600
TTTCACGGCTAAAGTACGTGCAAGCGCCCAAGGTGTCGAGGCGTCAGAT	
GAGGCATTGTCCGCCATCGCCCGTGCTGCAGACGGGGGGATGCGCGATGC	700
GCTCAGCTTGCTTGATCAAGCCATTTTCGTTTCAGCGACGGGAAACTTCGGC	
TCGACGACGTGCTGGCGATGACCGGGGCTGCATCATTTGCCGCCTTATCG	800
AGCTTCATCGAAGCCATCCACCGCAAAGATACAGCGGCGGTTCTTCAGCA	
CTTGGAACGATGATGGCGCAAGGGAAAGATCCGCATCGTTTGGTTGAAG	900
ACTTGATTTTGTACTATCGCGATTTATTGCTGTACAAAACCGCTCCCTAT	
GTGGAGGGAGCGATTCAAATTGCTGTGCTTGACGAAGCGTTCACTTCACT	1000
GTCGGAAATGATTCCGGTTTCCAATTTATACGAGGCCATCGAGTTGCTGA	
ACAAAAGCCAGCAAGAGATGAAGTGGACAAACCACCCGCGCCTTCTGTTG	1100
GAAGTGGCGCTTGTGAAACTTTGCCATCCATCAGCCGCCGCCCGTCGCT	
GTCGGCTTCCGAGTTGGAACCGTTGATAAAGCGGATTGAAACGCTGGAGG	1200
CGGAATTGCGGCGCCTGAAGGAACAACCGCCTGCCCTCCGTGACCGCC	
GCGCCGGTGAAAAAACTGTCCAAACCGATGAAAACGGGGGGATATAAAGC	1300
CCCGGTTGGCCGCATTTACGAGCTGTTGAAACAGGCGACGCATGAAGATT	
TAGCTTTGGTGAAAGGATGCTGGGCGGATGTGCTCGACACGTTGAAACGG	1400
CAGCATAAAGTGTGCGACGCTGCCTTGCTGCAAGAGAGCGAGCCGGTTGC	
AGCGAGCGCCTCAGCGTTTGTATTAAATTCAAATACGAAATCCACTGCA	1500
AAATGGCGACCGATCCCAAGTTTCGGTCAAAGAAAACGTGGAAGCGATT	
TTGTTTGAGCTGACAAACCGCCGCTTTGAAATGGTAGCCATTCCGGAGGG	1600
AGAATGGGGAAAAATAAGAGAAGAGTTCATCCGCAATAAGGACGCCATGG	
TGGAAAAAAGCGAAGAAGATCCGTTAATCGCCGAAGCGAAGCGGCTGTTT	1677
GGCGAAGAGCTGATCGAAATTAAAGAA	

FIG. 86

VAYQALYRVFRPQRFADMVGQEHVTKTLQSALLQHKISHAYLFSGPRGTG	
KTSAAKIFAKAVNCEQAPAAEPCNECPACLGITNGTVPDVLEIDAASNNR	100
VDEIRDIREKVKFAPTSARYKVYIIDEVHMLSIGAFNALLKTLEPPKHV	
IFILATTEPHKIPATIIISRCQRFDFRRIPLQAIVSRLKYVASAQGVEASD	200
EALSAIARAADGGMRDALSLLDQAISFSDGKLRLDDVLAMTGAASFAALS	
SFIEAIHRKDTAAVLQHLETMMAQGKDPHRLVEDLILYYRDLPLYKTAPY	300
VEGAIQIAVVDEAFTSLSEMI PVS NLYEAI ELLNKSQQEMKWTNHPRLLL	
EVALVKLCHPSAAAPSL SASELEPLIKRIETLEAELRRLKEQPPAPPSTA	400
APVKKLSKPMKTGGYKAPVGRIYELLKQATHEDLALVKGWADVLDTLKR	
QHKVSHAALLQESEPVAASASAFVLKFYIEIHCKMATDPTSSVKENVEAI	500
LFELTNRRFEMVAIPEGEWGKIREEFIRNKDAMVEKSEEDPLIAEAKRLF	
GEELIEIKE	559

FIG. 87

ATGGTGACAAAAGAGCAAAAAGAGCGGTTTCTCATCCTGCTTGAGCAGCT	100
GAAGATGACGTCCGACGAATGGATGCCGATTTTTCGTGAGGCAGCCATTC	
GCAAAGTCGTGATCGATAAAGAGGAGAAAAGCTGGCATTTTTATTTTCAG	200
TTCCGACAACGTGCTGCCGGTTCATGTATACAAAACGTTTGCCGATCGGCT	
GCAGACGGCGTTCCGCCATATCGCCGCCGTCCGCCATACGATGGAGGTCG	300
AAGCGCCGCGCGTAACCTGAGGCGGATGTGCAGGCGTATTGGCCGCTTTGC	
CTTGCCGAGCTGCAAGAAGGCATGTCGCCGCTTGTCGATTGGCTCAGCCG	400
GCAGACGCCTGAGCTGAAAGGAAACAAGCTGCTTGTCGTTGCCCGCCATG	
AAGCGGAAGCGCTGGCGATCAAACGGCGGTTTCGCCAAAAAATCGCTGAT	500
GTGTACGCTTCGTTTGGGTTTCCCCCCTTCAGCTTGACGTCAGCGTCGA	
GCCGTCCAAGCAAGAAATGGAACAGTTTTTGGCGCAAAAACAGCAAGAGG	600
ACGAAGAGCGAGCGCTTGCTGTACTGACCGATTTAGCGAGGGAAGAAGAA	
AAGGCCGCGTCTGCGCCGCCGTCCGGTCCGCTTGTCATCGGCTATCCGAT	700
CCGCGACGAGGAGCCGGTGCGGCGGCTTGAAACGATCGTCGAAGAAGAGC	
GGCGCGTCGTTGTGCAAGGCTATGTATTTGACGCCGAAGTGAGCGAATTA	800
AAAAGCGGCCGACGCTGTTGACCATGAAAATCACAGATTACACGAAGTC	
GATTTTAGTCAAAATGTTCTCGCGCGACAAAGAGGACGCCGAGCTTATGA	900
GCGGCGTCAAAAAGGCATGTGGGTGAAAGTGCGCGGCAGCGTGCAAAAC	
GATACGTTTCGTCCGTGATTTGGTCATCATCGCCAACGATTTGAACGAAAT	1000
CGCCGCAACGAACGGCAAGATACGGCGCCGGAAGGGGAAAAGAGGGTTCG	
AGCTCCATTTGCATACCCCGATGAGCCAAATGGACGCGGTACCTCGGTG	1100
ACAAAATCATTGAGCAAGCGAAAAAATGGGGGCATCCGGCGATCGCCGT	
CACCGACCATGCCGTTGTTCAAGTCGTTTCCGGAGGCCTACAGCGCGGCGA	1200
AAAAACACGGCATGAAGGTCATTTACGGCCTTGAGGCGAACATCGTCGAC	
GATGGCGTGCCGATCGCCTACAATGAGACGCACCGCCGTCTTTCGGAGGA	1300
AACGTACGTCGTCTTTGACGTCGAGACGACGGGCTGTGCGGCTGTGTACA	
ATACGATCATTGAGCTGGCGGCGGTGAAAGTGAAAGACGGCGAGATCATC	1400
GACCGATTCATGTCGTTTGCCAACCCTGGACATCCGTTGTCGGTGACAAC	
GATGGAGCTGACTGGGATCACCGATGAGATGGTGAAAGACGCCCCGAAGC	1500
CGGACGAGGTGCTAGCCCGTTTTGTTGACTGGGCCGGCGATGCGACGCTT	
GTTGCCACAAACGCCAGCTTTGACATCGGTTTTTTTAAACGCGGGCCTCGC	1600
TCGCATGGGGCGCGGCAAAATCGCGAATCCAGTCATCGATACGCTCGAGC	
TGGCCCGTTTTTTATACCCGGATTTGAAAAACCATCGGCTCAATACATTG	1700
TGCAAAAAATTTGACATTGAATTGACGCAGCATACCGCGCCATCTACGA	
CGCGGAGGCGACCGGGCATTGCTTATGCGGCTGTTGAAGGAAGCGGAAG	1800
AGCGCGGCATACTGTTTCATGACGAATTAAACAGCCGCACGCACAGCGAA	
GCGTCCTATCGGCTTGCGCGCCCGTTCCATGTGACGCTGTTGGCGCAAAA	1900
CGAGACTGGATTGAAAAATTTGTTCAAGCTTGTCGATTGTGCGCACATTC	
AATATTTTACCCTGTGCCGCGCATCCCGCGCTCCGTGCTCGTCAAGCAC	2000
CGCGACGGCCTGCTTGTCGGCTCGGGCTGCGACAAAGGAGAGCTGTTTGA	
CAACTTGATCCAAAAGGCGCCGGAAGAAGTCGAAGACATCGCCCGTTTTT	2100
ACGATTTTCTTGAAGTGCATCCGCCGGACGTGTACAAGCCGCTCATCGAG	
ATGGATTATGTGAAAGACGAAGAGATGATCAAAAACATCATCCGCAGCAT	2200
CGTCGCCCTTGGTGAGAAGCTTGACATCCCGGTTGTCGCCACTGGCAACG	

FIG. 88A



TCCATTACTTGAACCCAGAAGATAAAATTTACCGGAAAATCTTAATCCAT	
TCGCAAGGCGGGGCGAATCCGCTCAACCGCCATGAACTGCCGGATGTATA	2 300
TTTCCGTACGACGAATGAAATGCTTGACTGCTTCTCGTTTTTAGGGCCGG	
AAAAAGCGAAGGAAATCGTCGTTGACAACACGCAAAAAATCGCTTCGTTA	2 400
ATCGGCGATGTCAAGCCGATCAAAGATGAGCTGTATACGCCGCGCATTGA	
AGGGGCGGACGAGGAAATCAGGGAAATGAGCTACCGGCGGGCGAAGGAAA	2 500
TTTACGGCGACCCGTTGCCGAACTTGTTGAAGAGCGGCTTGAGAAGGAG	
CTAAAAAGCATCATCGGCCATGGCTTTGCCGTCATTTATTTGATCTCGCA	2 600
CAAGCTTGTGAAAAAATCGCTCGATGACGGCTACCTTGTCGGGTCGCGCG	
GATCGGTCGGCTCGTCGTTTGTGCGCAGCATGACGGAAATCACCGAGGTC	2 700
AATCCGCTGCCGCCGCATTACGTTTGCCCGAACTGCAAGCATTTCGGAGTT	
CTTTAACGACGGTTCAGTCGGCTCAGGGTTTGATTGCCGGATAAAAACT	2 800
GCCCGCGATGTGGGACGAAATACAAGAAAGACGGGCACGACATCCCGTTT	
GAGACGTTTCTCGGCTTTAAAGGCGACAAAGTGCCGGATATCGACTTGAA	2 900
CTTTTCCGGCGAATACCAGCCGCGCGCCCACTATACGAAAGTGCTGT	
TTGGCGAAGACAACGTCTACCGCGCCGGGACGATTGGCACGGTCGCTGAC	3 000
AAAACGGCGTACGGATTTGTCAAAGCGTATGCGAGCGACCATAACTTAGA	
GCTGCGCGGCGCGGAAATCGACGGCTCGCGGCTGGCTGCACCGGGGTGAA	3 100
GCGGACGACCGGGCAGCATCCGGGCGGCATCATCGTCGTCCCGGATTATA	
TGGAAATTTACGATTTTACGCCGATTCAATATCCGGCCGATGACACGTCC	3 200
TCTGAATGGCGGACGACCCATTTCTGACTTCCATTTCGATCCACGACAATTT	
GTTGAAGCTCGATATTCTCGGGCAGCAGCATCCGACGGTCATTTCGCATGC	3 300
TGCAAGATTTAAGCGGCATCGATCCGAAAACGATCCCGACCGACGACCCG	
GATGTGATGGGCATTTTCAGCAGCACCGAGCCGCTTGCGGTTACGCCGGA	3 400
GCAAATCATGTGCAATGTCGGCAGCATCGGCATTCCGGAGTTTGGCACGC	
GCTTCGTTCCGGCAAATGTTGGAAGAGACAAGGCCAAAAACGTTTTCCGAA	3 500
CTCGTGCAAATTTCCGGCTTGTCGCACGGCACCGATGTGTGGCTCGGCAA	
CGCGCAAGAGCTCATTCAAAACGGCACGTGTACGTTATCGGAAGTCATCG	3 600
GCTGCCGCGACGACATTATGGTCTATTTGATTTACCGCGGGCTCGAGCCG	
TCGCTCGCTTTTAAATCATGGAATCCGTGCGCAAAGGAAAAGGCTTAAC	3 700
GCCGGAGTTTGAAGCAGAAATGCGCAAACATGACGTGCCGGAGTGGTACA	
TCGATTCATGCAAAAAAATCAAGTACATGTTCCCGAAAGCGCACGCCGCC	3 800
GCCTACGTGTTAATGGCGGTGCGCATCGCCTACTTTAAGGTGCACCATCC	
GCTTTTGTATTACGCGTCGTACTTTACGGTGCGGGCGGAGGACTTTGACC	3 900
TTGACGCCATGATCAAAGGATCACCCGCCATTTCGCAAGCGGATTGAGGAA	
ATCAACGCCAAAGGCATTTCAGGCGACGGCGAAAGAAAAAAGCTTGCTCAC	4 000
GGTTCTTGAGGTGGCCTTAGAGATGTGCGAGCGCGGCTTTTCCTTTAAAA	
ATATCGATTTGTACCGCTCGCAGGCGACGGAATTCGTCAATTGACGGCAAT	4 100
TCTCTCATTCCGCCGTTCAACGCCATTCCGGGGCTTGGGACGAACGTGGC	
GCAGGCGATCGTGCGCGCCCGCGAGGAAGGCGAGTTTTTGTGCAAGGAGG	4 200
ATTTGCAACAGCGCGGCAAATTGTGCAAAACGCTGCTCGAGTATCTAGAA	
AGCCGCGGCTGCCTTGACTCGCTTCCAGACCATAACCAGCTGTCGCTGTT	4 300

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FIG. 88B

MVTKEQKERFLILLEQLKMTSDEWMPHFREAAIRKVVIDKEEKSWHFFYFQ	
FDNVLPVHVYKTFADRLQTAFRHIAAVRHTMEVEAPRVTEADVQAYWPLC	100
LAELQEGMSPLVDWLSRQTPPELKGNKLLVVARHEAEALAIKRRFAKKIAD	
VYASFGFPPLQLDVSVEPSKQEMEQFLAQKQOEDEERALAVLTDLAREEE	200
KAASAPPSGPLVIGYPIRDEEPVRRLETIVEEEERRVVVQGYVFDAEVSEL	
KSGRTLTLTKITDYTNSILVKMFSDKEDAEMLSGVKKGMWVKVRGSVQN	300
DTFVRDLVIIANDLNEIAANERQDTAPEGEKRVELHLHTPMSQMDAVTSV	
TKLIEQAKKWGHPAIAVTDHAVVQSFPEAYSAAKKHGMKVIYGLEANIVD	400
DGVPIAYNETHRRLSEETYVVFVETGLSAVYNTIIELAAVKVKDGEII	
DRFMSFANPGHPLSVTTMELTGITDEMVKDAPKPDEVLARFVDWAGDATL	500
VAHNASFDIGFLNAGLARMGRGKIANPVIDTLELARFLYPDLKNHRLNTL	
CKKFDIELTQHHRAIYDAEATGHLLMRLLEAEERGILFHDELNSRTHSE	600
ASYRLARPFHVTLLAQNETGLKNLFKLVSLSHIQYFHRVPRI PRSVLVKH	
RDGLLVGSGCDKGELFDNLIQKAPEEVEDIARFYDFLEVHPPDVYKPLIE	700
MDYVKDEEMIKNIIRSIVALGEKLDIPVVATGNVHYLNPEDKIIYRKILIH	
SQGGANPLNRHELDPVYFRTTNEMLD CFSFLGPEKAKEIVDNTQKIASL	800
IGDVKPIKDELYTPRIEGADEEIREMSYRRAKEIYGDPLPKLVEERLEKE	
LKSIIGHGFAVIYLYLSHKLVKKSLDDGYLVGSRGSGVSSFVATMTEITEV	900
NPLPPHYVCPNCKHSEFFNDGSGVSGFDLPDKNCPRCGTKYKKDGHDI PF	
ETFLGFGKDKVPDIDLNFSGEYQ PRAHNYTKVLFGEDNVYRAGTIGTVAD	1000
KTAYGEVKAYASDHNLELRGAEIDLAAGCTGVKRTTGQHPGGIIVVPDYM	
EIYDFTPIQYPADDTSSSEWRTHFDFHSIHDNLLKLDILGHDDPTVIRML	1100
QDLSGIDPKTIPTDDPDVMGIFSSTEPLGVTPEQIMCNVGTIGIPEFGTR	
FVRQMLEETRPKTFSELVQISGLSHGTDVWLGN AQELIQNGTCTLSEVIG	1200
CRDDIMVYLIYRGLEPSLAFKIMESVRKGKGLTPEFEAEMRKHDVPEWYI	
DSCKKIKYMFPAKAAAYVLM AVRIAYFKVHHPLLYASYFTVRAEDFDL	1300
DAMIKGSPAIRKRIEEINAKGIQATAKEKSLTVLEVALEM CERGFSFKN	
IDLYRSQATEFVIDGNSLIPPFNAI PGLGTNVAQAIVRAREEGEFLSKED	1400
LQQRGKLSKTLLEYLESRGCLDSL PDHNQLSLF	

FIG. 89